The OIL AND GAS JOURNAL

The Cavalcade of Oil

TEN OF A SERIES

ICAL EXPLORATIONS *today mark the most advancement in man's century-old search earth's rich oil deposits. The illustration depicts a typical field crew in action during days of prospecting by seismograph.*

HUGHES
TOOL COMPANY
HOUSTON, TEXAS
WORLD STANDARD OF THE INDUSTRY

Previous to the advent of geophysics, there was no positive method of determining the location of subsurface structures and geologists went about their search armed with pick, hammer, and lens to examine rocks in the field. The world's ever-increasing demands for oil, the competitive zeal of oil exploration and producing companies, and some brilliant scientific thinking brought geophysics into being as a practical aid to geology in petroleum prospecting. The science of geophysics, employing such factors as seismology, mathematics, geodetics, and magnetism, has since its origin been profoundly successful in locating billions of barrels of new oil the world over.

With pardonable pride, we point to the fact that without the revolutionary advancement in the art of drilling represented by the invention and development of the Hughes Rock Bit, the present deep pools of oil would still remain untouched. The part Hughes products have played in the volume production of oil since 1909 is reflected in the constantly increasing depth logs of wells in oil fields throughout the world. Constant research and development of Hughes Rock Bits have made them "first choice" among drillers everywhere. Hence the name HUGHES is recognized in any oil field, anywhere on the globe, as "WORLD STANDARD OF THE OIL DRILLING INDUSTRY."

PRICE 20 CENTS TABLE OF CONTENTS PAGE 51 OCTOBER 28, 1948

This 15'x95' Vacuum Fractionating Tower being loaded for barge delivery to one of Texas' great refineries on the Gulf Coast is typical of Wyatt's superior fabrications for the Petroleum Industry.

WYATT METAL & BOILER WORKS

STEEL PLATE DESIGNERS, FABRICATORS AND ERECTORS TO INDUSTRY'S SPECIFICATIONS

Wyatt's

HOUSTON - DALLAS

Service Ratings			
Type	Size	Pounds per square inch	
		Steam	Non-Shock Cold WOG
Screwed	¼"–2"	150	225
	2½"–4"	125	175
Flanged	1"–2"	125	200
	2½"–4"	125	175

Fig. 709 Saddle Style —
Inside Screw — Bronze Mounted or All Iron

Walworth

iron body wedge gate valves

...the last word in Dependability

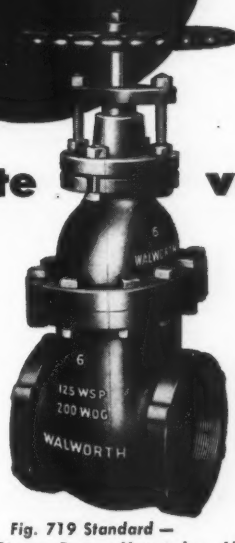


Fig. 719 Standard —
Non-Rising Stem — Bronze Mounted or All Iron

Service Ratings			
Type	Size	Pounds per square inch	
		Steam	Non-Shock Cold WOG
Screwed or Flanged	2"–12"	125	200
	14" and larger	125	150

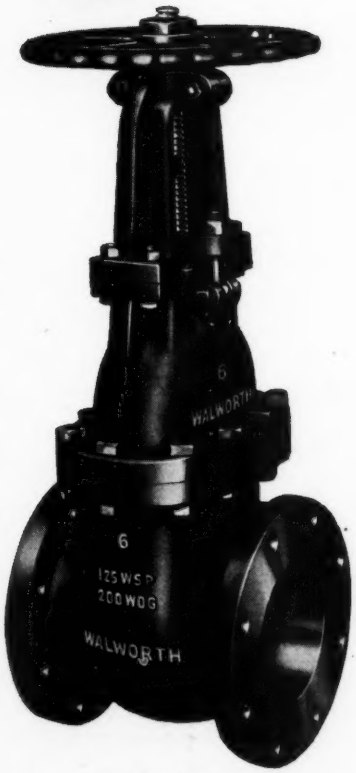


Fig. 726F Standard —
Outside Screw and Yoke — Bronze Mounted or All Iron

Service Ratings			
Type	Size	Pounds per square inch	
		Steam	Non-Shock Cold WOG
Screwed or Flanged	2"–12"	125	200
	14"–16"	125	150
	16" and larger	*	150

* For steam service requiring valves 18" and larger we recommend the use of Walworth 150-Pound Cast Steel Valves.

Walworth Fig. 709 Saddle Gate Valves are recommended for lines carrying sludge, and fluids of high viscosity. They are easy to take apart, clean, and put together. They are available in either bronze mounted or all iron types, screwed or flanged ends. Two holes inside the bonnet of bronze mounted valves permit draining when the valves are open, thus eliminating the risk of damage to the valve due to freezing. All parts are designed for maximum service and strength.

Walworth Fig. 719 Standard Non-Rising Stem Valves are recommended for general service. The bronze mounted valves are furnished with bronze stems, seat rings, and disc faces. The all iron valves have nickel-plated steel stems, integral disc faces, and renewable screwed-in seat rings. Non-rising stems make them suitable for use where clearance is a factor. When the valves are open, the disc is clear of the fluid passageway.

Walworth Fig. 726F Standard OS&Y Valves are especially recommended for steam and services above atmospheric temperature. Their streamlined ports permit smooth, easy flow.

For further information about Walworth Iron Body Valves, as well as Walworth's *complete line* of valves, fittings, and flanges, see your nearby Walworth distributor, or write:

WALWORTH

valves and fittings

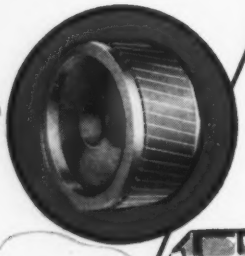
60 East 42nd Street, New York 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

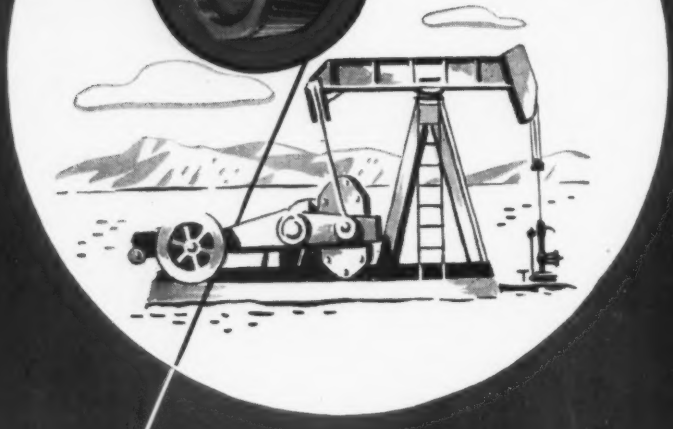
The Oil and Gas Journal, published Thursdays by The Petroleum Publishing Company. Entered as second-class matter at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $3 yearly. Copyright 1948.

only the QZK

has the



Copper spun Rotor!



. . . the one-piece, indestructible rotor that assures the ability to stand up under the heavy starting loads . . . the strains of peak capacity operation for long periods found in pumping rig service. The Fairbanks-Morse QZK polyphase, squirrel cage protected frame motor is designed for durability . . . to provide true dependability, smooth, quiet operation for every pumping application. Fairbanks, Morse & Co., Chicago 5, Illinois.

When it comes to motors . . .

FAIRBANKS-MORSE

A name worth remembering

OIL FIELD EQUIPMENT • DIESEL ENGINES
DIESEL LOCOMOTIVES • PUMPS
SCALES • MOTORS • FARM EQUIPMENT
RAILROAD MOTOR CARS and STANDPIPES
GENERATORS • STOKERS • MAGNETOS

Stop hose "blow-outs" with B. F. Goodrich rotary drilling hose

Patented metallic mesh tape adds strength without weight

B. F. GOODRICH builds a rotary drill hose you can put out of your mind when you put it on your rig. No more worries about hose "blow-outs", shutdown time, damage to drilling bit or rig, possible injury (and certainly inconvenience) to the crew. Here's the story—inside and out—on this stronger, longer-lasting rotary drilling hose.

Helix tape saves weight—Sturdy plies of duck are reinforced with patented helically-wound wire tape that gives highest burst strength with least weight, most flexibility. The single helically-wound tape ply weighs much less than the fabric plies necessary to give equivalent strength.

Cover resists abrasion—Abrasion-resistant rubber armors this B. F. Goodrich hose cover for rough treatment. And you can let it stand out in the sun, wind, rain, all kinds of weather, without harm.

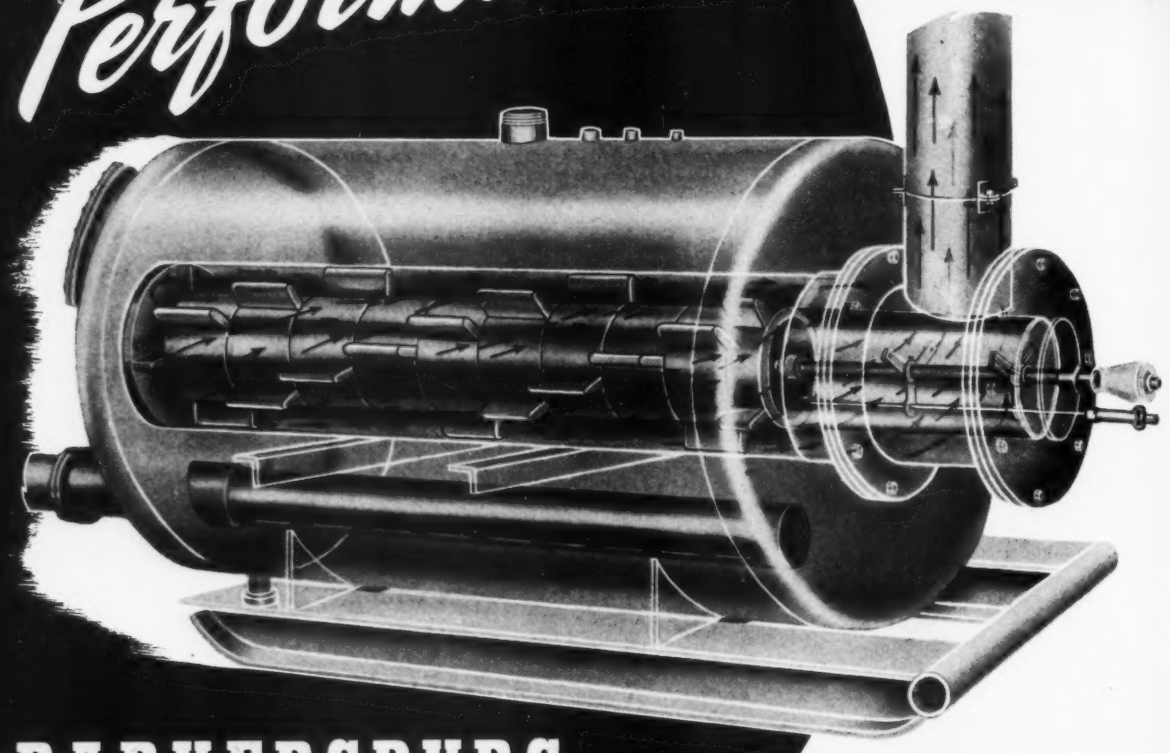
Easy to handle—No dead weight to drag when this BFG hose is moved on or off the job. Helix tape reinforcement keeps it flexible, because the single ply of tape is more flexible than equivalent multiple fabric plies. Easy to coil up. Hangs well from the standpipe.

Oil-proof tube—Tube is made of a special oilproof rubber compound—using oil in the "mud" will not cause it to swell, or otherwise affect it.

Coupling guaranteed leak-proof for the life of the hose. See this and other fine hose for oil rigs at your local distributor or write: *The B. F. Goodrich Company, Industrial Products Division, Akron, Ohio.*

B.F.Goodrich
RUBBER FOR INDUSTRY

Performance Proves it



PARKERSBURG

DIRECT, HORIZONTAL HEATERS

break down oil and water emulsions more efficiently than any other heater

Uniquely combining convection and radiation heat, Parkersburg Heaters have a balanced heat that is evenly distributed over the entire surface of the heating tube. Hot or cool spots are avoided . . . maximum efficiency of the heating tube is obtained and scale deposits are minimized.

The efficiency-value of this new approach to the heat-treating of oil, as well as exclusive features of Parkersburg Heaters have been proved by the performance of hundreds of heaters now in service.

Ask your nearest Parkersburg Representative, or write for complete details about all the features of Parkersburg Horizontal Heaters.

Only Parkersburg Horizontal Heaters Give You:

- 100% combustion.
- No flame contacts heating tube.
- Even distribution of heat.
- Less scale deposits.
- Combined convection and radiation heat.
- Free lengthwise expansion of combustion tubes.
- Easiest to assemble, dismantle and clean.

THE PARKERSBURG RIG & REEL CO.

PARKERSBURG & OCS PRODUCTS

GENERAL OFFICES, PARKERSBURG, W. VA.
Plants at Parkersburg, W. Va., Coffeyville, Kan., Houston, Texas
District Offices:
Dallas - Houston - Los Angeles - Tulsa - New York

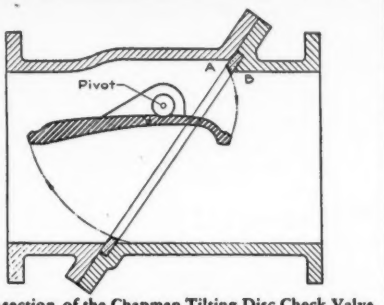
OCS

PARKERSBURG

Floating Disc Action Gives

CHAPMAN TILTING DISC CHECK VALVES

Quick, Quiet Closing

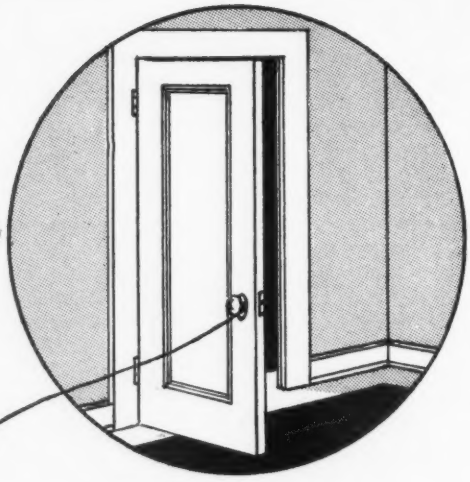


Cross-section of the Chapman Tilting Disc Check Valve illustrating the way that the balanced disc is supported on the pivot, with arrows showing the travel of the disc. A feature of the design is that the disc seat lifts away from the body seat when opening, and drops into contact when closing, with no sliding or wearing of the seats.

Unlike ordinary check valves, Chapman Tilting Disc Check Valves have a balanced hinged-pin disc *which works with the stream.* The disc closes quickly and quietly, with its motion cushioned by the effect of the stream against the short flap. Since there is no slamming of the disc, hammering and pipe line stresses are eliminated.

Not only does this unique valve minimize maintenance costs but it also reduces head losses 65% to 85% over conventional type check valves. When installed on pump discharge lines substantial power savings are possible. Available in either iron or steel. **For engineering data and test results send for bulletin.**

THE **CHAPMAN** VALVE
MANUFACTURING COMPANY
INDIAN ORCHARD, MASSACHUSETTS



...LOOK US UP

at the A. P. I. Meeting

TIME: NOVEMBER 8 - 11

PLACE: STEVENS HOTEL, CHICAGO

YOUR HOSTS:

Sid Barber	Jim Greer
Ed Behrends	Linc Hall
Paul Bush	Dick Rice
Stan Gill	Al Seither
Herb Grassman	Frank Williams

The latch-string is out—we're looking forward to seeing you

TAYLOR FORGE

TAYLOR FORGE & PIPE WORKS General Offices & Works: Chicago 90, Ill. (P.O. Box 485) Eastern Plant: Carnegie, Pa. Western Plant: Fontana, Calif. • District Offices—New York: 50 Church Street • Philadelphia: Broad Street Station Bldg. Chicago District Sales: 208 S. LaSalle Street • Houston: City National Bank Bldg. • Los Angeles: Subway Terminal Bldg.

3*

WARM UP FLOW LINE FREEZE-UPS!

Move your point-of-high-pressure-reduction from the surface to bottom of the hole. *Then let natural formation temperatures re-heat the flow stream before it reaches wellhead connections.*

Results: freeze-ups are prevented; the expense of installing and maintaining surface heaters is eliminated; surface flowing pressures are reduced to safe workable limits.

Otis Removable Bottom Hole Regulators are easy to run, set, and service (under pressure through use of a steel measuring line and wire line tools) at any depth in the tubing where temperature of the flow stream is sufficiently high to compensate for the loss in temperature caused by taking the pressure drop across the Regulator without approaching the freezing point. Although surface choke adjustments automatically change rates of flow through the tool and tubing, the Otis Regulator maintains an almost constant delivery pressure differential.

Otis Removable Bottom Hole Regulators consist of a simple double-acting spring-loaded valve mechanism attached to either a Type B or Type J Otis locking and pack-off mechanism. Before installation, this valve mechanism is set to give the desired amount of pressure differential across the Regulator. Also, if necessary, the well can be killed without taking time to pull the Regulator. Pumping into the tubing reverses the valve action, thus allowing circulation down through the tool.

A surface-controlled rate of production with all the advantages of bottom-hole choking. Pressures are reduced to safe, non-freezing limits.
Costly installation and maintenance of surface-heaters is eliminated.
After pressure has been choked down to predetermined limits across the Regulator valve, formation temperatures then act as a sub-surface heater to re-heat the flow stream before it reaches surface connections.
OTIS REMOVABLE BOTTOM HOLE REGULATOR
Compression introduced into a spring by an adjusting ring pre-determines correctly the amount of pressure differential across the Regulator necessary to move the valve seat up and away from the valve to permit reduced flow through the Regulator. Note the comparatively direct line of flow which results in minimum turbulent and cutting action as pressure drops. This new Regulator valve design also permits the installation of two Regulator mechanisms in tandem on a single locking and pack-off mechanism in order to obtain greater pressure reduction.

*** NO. 3** *in a series of high-pressure production problems and practices and the allied use of Otis Sub-Surface Controls and Services. Reprints of the series, suitable for filing, are available upon written request to Otis Pressure Control, Inc., Box 7206, Dept. B., Dallas, Texas.*

NEW LITERATURE AVAILABLE

"Otis Removable Tubing Safety Valves." Bulletin No. 48-104 gives a comprehensive description of all types of Otis Tubing Safety Valves and illustrates how they are used to prevent wild flow through the tubing. Included are data, parts list, and operating instructions. Write to address shown above.

PRESSURE CONTROL – OTIS – SERVICE – EQUIPMENT

OTIS PRESSURE CONTROL, INC.

(T-20)

FIELD OFFICES: **TEXAS:** HOUSTON, CORPUS CHRISTI, ODESSA, and LONGVIEW **OKLAHOMA:** OKLAHOMA CITY **LOUISIANA:** NEW IBERIA

OTIS ENGINEERING CORPORATION – MANUFACTURE AND DEVELOPMENT

DISTRIBUTORS: **OTIS PRESSURE CONTROL, INC.**, DALLAS, TEX.; **OTIS EASTERN SERVICE, INC.**, BOLIVAR, N. Y., **WESTERN PRESSURE CONTROL**, LOS ANGELES, CALIF.
EXPORT SALES AND SERVICES: **OTIS PRESSURE CONTROL EXPORT, INC.**, POST OFFICE BOX 7206, DALLAS, TEXAS, U. S. A., CARACAS, SOUTH AMERICA

the "New Look"

IN SUCKER ROD WIPERS *gives you a clean string of Rods*

PATTERSON-BALLAGH SUCKER ROD PARAFFIN WIPER

CODE: *SUBAGENT*
(Specify Thread Connection Desired)

A "New Look" in Sucker Rod Wipers is more than just a change in appearance. It means that this model of the popular line of Patterson-Ballagh Sucker Rod Wipers has been improved to do a better job of stripping paraffin from rods, squares and couplings for you.

The main wiping rubbers are sealed in the body so that no oil leaks on the floor. The rubber grips the sucker rods in such a manner that the rods are wiped clean no matter how fast the string is pulled. They will seal against all but excessive gas pressures and will allow oil to flow to tank if the well makes a head.

Special spark proof lids for the Paraffin Wiper are available at a slightly higher cost. Install one of these Patterson-Ballagh Sucker Rod Paraffin Wipers on your rig today and give your rods a clean wipe the next time they are pulled.

RUBBER WIPING ELEMENTS

Code: *PRAETOR*

Code: *REFACE*

The two main D-25 rubber wiping elements, code: PRAETOR, have been strengthened to allow for expansions from ½" to 2⅛". Below these, is the cone-shaped rubber element, code: REFACE, which acts as a one way valve. This wiping element prevents the paraffin that has been stripped from the rods falling back into the hole.

PATTERSON BALLAGH · SEAL OF QUALITY · OIL FIELD SPECIALTIES

Specify

PATTERSON-BALLAGH

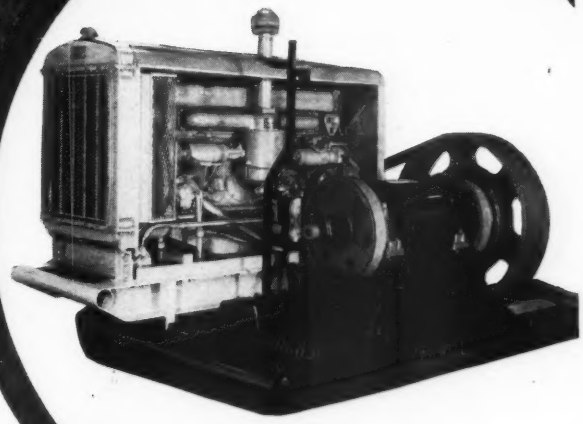
DIVISION OF BYRON JACKSON CO

SUCKER ROD WIPERS

MAIN OFFICE: 1900 East 65th Street, Los Angeles 1, California
6247 Navigation Blvd., Houston 11, Texas ★ 808 Graybar Bldg., New York 17, N. Y. ★ 330 Russ Bldg., San Francisco 4, Calif.
T.I.P.S.A., Santiago Del Estero 286; Buenos Aires, Argentina ★ H. F. Towler, 9 Cavendish Square; London, W1, England

Where dependabilty is a *must...*

MURPHY DIESEL POWER



Murphy Selected for First Diesel Powered Drilling Operations in Eastern Canada

Up in New Brunswick where complete power dependability is a must, New Brunswick Oilfields, Ltd., selected Murphy to power their Well No. 121 in Albert County. Particularly significant in the selection of Murphy Power is the fact that this installation is believed to be the first diesel powered drilling operation in eastern Canada.

Wherever Murphy Diesels are used they establish enviable records for dependability. Offering such outstanding design features as "true" diesel operation . . . unit fuel injection . . . four valves per cylinder . . . dual overhead camshafts . . . flywheel end cam drive . . . and hydraulic servo-type governor, the Murphy Diesel delivers more power continuously at lower cost. The booklet *"7 Questions to Ask a Diesel Engine Salesman"* gives full details; ask for a copy.

MURPHY DIESEL COMPANY
5305 W. Burnham St. • Milwaukee 14, Wis.

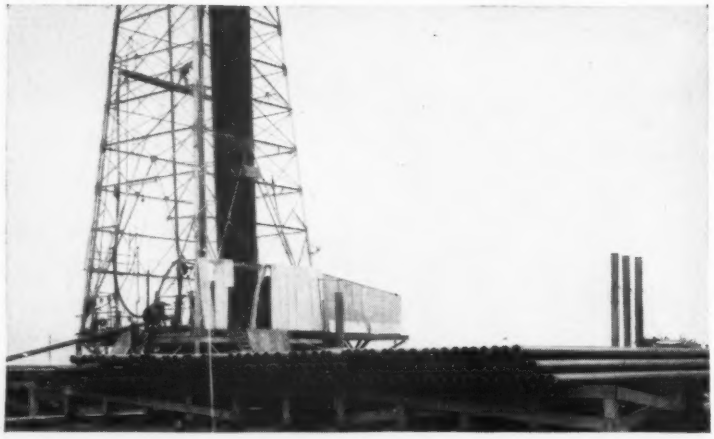
The large illustration above shows the location of New Brunswick Oilfields Well No. 121. In the inset is the "Oilwell" cable tool drilling unit powered by a Murphy Diesel Model ME-66. This engine is rated at 150 H.P. continuous, 180 H.P. intermittent.

LOWEST *ULTIMATE* POWER COST

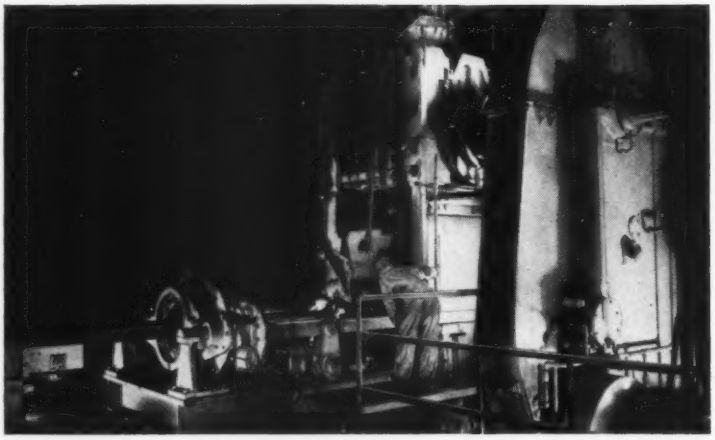
FACTORY BRANCH—SALES, PARTS and SERVICE
416 SOUTH DETROIT AVENUE, TULSA, OKLAHOMA

MURPHY DIESEL

DEPENDABILITY THROUGH RESEARCH



IN THE FIELD, LOUISIANA: Running a 9200-foot string of 9⅝-inch S-80 SMITHway Casing.



IN THE A. O. SMITH PIPE MILL: Research developed this special Smith-designed cold compression machine for externally sizing SMITHway Casing

SMITH*way* CASING · LINE PIPE

A. O. SMITH CORPORATION

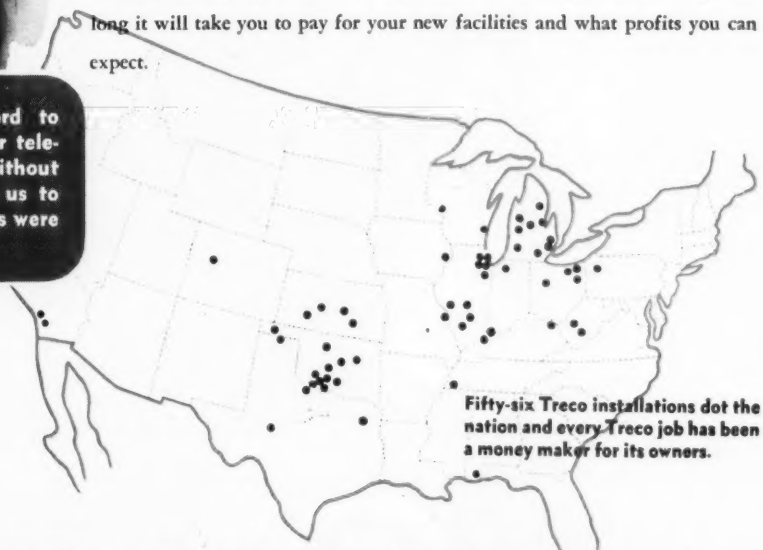
New York 17 • Pittsburgh 19 • Atlanta 3 • Chicago 4 • Tulsa 3 • Dallas 1
Houston 2 • Seattle 1 • Los Angeles 14 • International Division: Milwaukee 1

You Can Build NOW ... .Profitably

The cost of practically everything used in refinery construction is going up. Prices may continue to rise; but *you can still afford to build or remodel and have a quick return on your investment.*

Assuming that the costs of material and labor may continue upward, *there is a known point to which you can safely project your costs* of construction. Treco can show you how much you can afford to spend and how you can define all costs, entering into the project. With all the variables accounted for; with the cost of construction, materials, labor and crude determinable it is possible to project the cost of operations to the degree of knowing how long it will take you to pay for your new facilities and what profits you can expect.

Treco can show how you can afford to build or remodel NOW. Wire, write or telephone to arrange for a conference, without obligation to you. Our planes enable us to serve you as completely as if our offices were in your city.



Fifty-six Treco installations dot the nation and every Treco job has been a money maker for its owners.

TRECO

The REFINERY ENGINEERING Co.

Phone 5-5511 Tulsa, Oklahoma

THE TIGER BRAND SPECIALIST SAYS—
"If your wire
USS
AMERICAN
TIGER BRAND
WIRE ROPE
UNITED STATES STEEL

rope takes a beating like this, you ought to check the application"

"The foreman on this job was blowing his top. He was already behind in production when this machine went down. He swore that the wire lines were no good.

"We took a look at the sheaves. They were badly worn. Then I asked him, 'When did you check those grooves?' Nobody on the job could remember when the sheaves had been regrooved.

"We got out a gage. Sure enough, that's where the trouble was. The grooves had worn down so that the proper size gage nowhere near bottomed. Now they're regrooving and I sold him on the idea of letting me check all his equipment. I'll bet we keep his business and his lines will give twice the service."

Are you sure you have the RIGHT wire rope for your job!

Are you convinced beyond a doubt that your rotary lines are operating at the lowest obtainable unit cost?

Are you sure that your equipment is contributing fully to long, safe line life?

If not, you should have a check-up by a TIGER BRAND Specialist—a thoroughly experienced field service engineer.

To show you how the proper application of wire lines can save you money, we have prepared a new booklet to help you check your own operating conditions.

SEND FOR NEW FREE BOOKLET

American Steel & Wire Company
Rockefeller Building, Dept. P-10
Cleveland 13, Ohio

Gentlemen:

Please send me a copy of your booklet, "Valuable Facts about the use and care of Wire Rope."

Name.....

Company.....

Position.....

Address.....

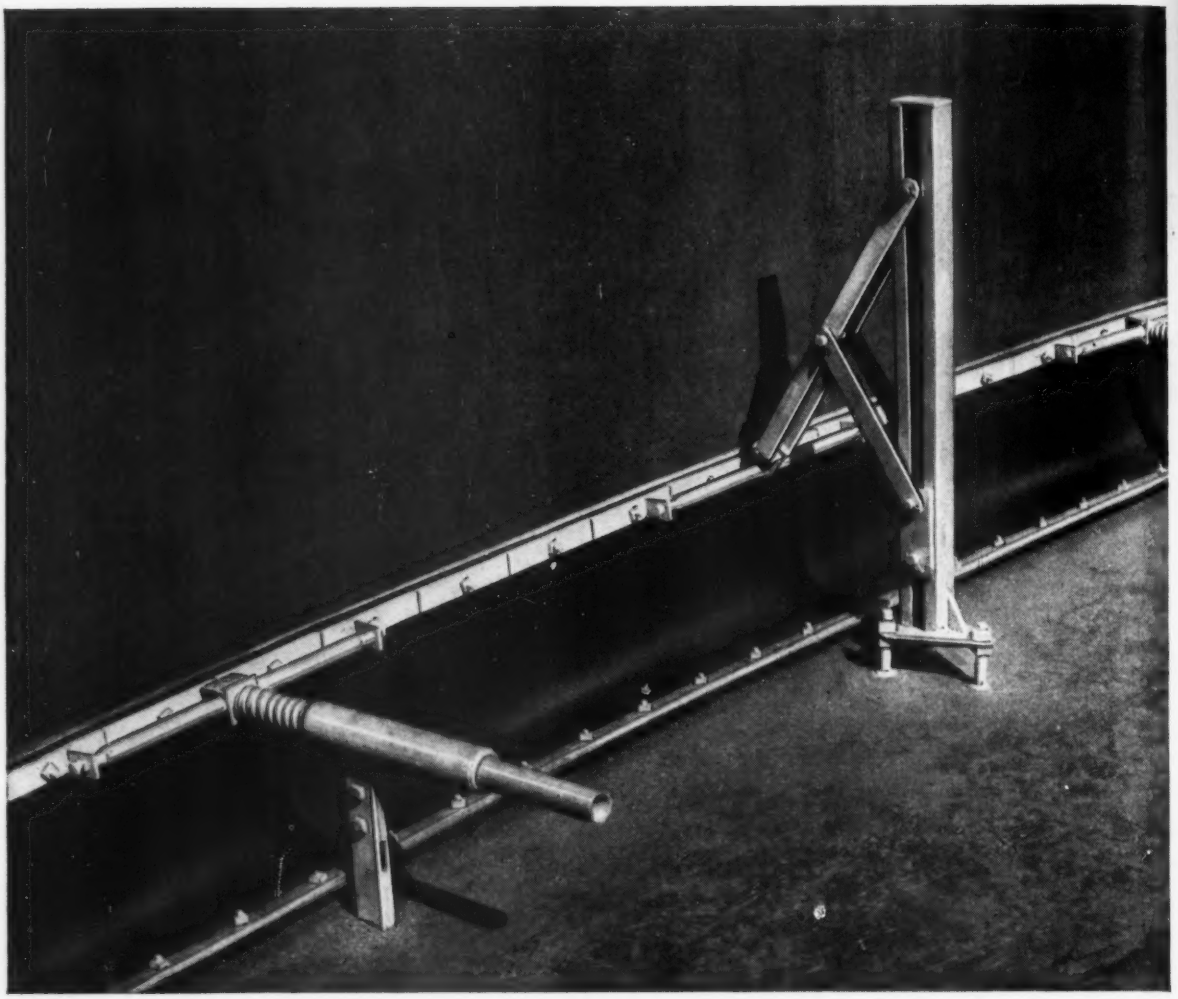
AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA STEEL COMPANY, SAN FRANCISCO
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

AMERICAN TIGER BRAND WIRE ROPE

Excellay Preformed

UNITED STATES STEEL



SEAL OF APPROVAL (ON A FLOATING ROOF)

The effectiveness of the Graver Floating Roof in preventing the loss of valuable petroleum products through evaporation, is largely dependent upon the closure between tank roof and shell. The sealing ring, of galvanized or stainless steel, connected to the roof by a heavy-duty synthetically treated fabric, is held tightly against the shell by closely spaced spring actuated pushers . . . follows even the slightest variation of the shell plates perfectly. Result: Complete protection against vapor loss.

The Graver Floating Roof is designed for those installations where excessive differences in filling and withdrawal exist . . . a deep water terminal, for example. In addition to a vapor-tight seal, the roof offers a full double deck which insulates the stored product against "boiling." Since the roof lies directly upon the surface of the liquid, corrosion is eliminated, and it is well suited to the storage of "sour" crudes.

To apply the seal of approval, specify the Graver Floating Roof with full double deck. Details on request.

FABRICATED PLATE DIVISION

GRAVER TANK & MFG. CO., INC.

East Chicago, Indiana

Graver offers a complete service to the petroleum industry including Expansion Roof Tanks, Floating Roof Tanks and pressure vessels. In addition, Graver is prepared to furnish specialized steel plate work such as fractionating columns and class one vessels as well as stainless and alloy fabrication; water conditioning equipment of all types; and through the Graver Construction Co., is prepared to handle all types of petroleum and chemical construction work.

GRAVER

NEW YORK • PHILADELPHIA • CHICAGO • CATASAUQUA, PA. • HOUSTON • SAND SPRINGS, OKLA.

BUY FROM BOVAIRD

Because...

1. **BOVAIRD** has the knowledge and experience.
2. **BOVAIRD** has an active and friendly interest in your problems.
3. **BOVAIRD** is constantly studying field conditions.
4. **BOVAIRD** has dependable sources of supply for the equipment you need.
5. **BOVAIRD** has the will to work and a determination to SERVE.

These factors are essential to rendering a successful supply service and have always been the inspiration and objective of the Bovaird organization.

"Buy From Bovaird"

SUPPLY BOVAIRD COMPANY

OFFICES AND STORES

ILLINOIS—Clay City, Grayville, Salem
KANSAS—Chase, McPherson, Pratt, Russell, Wichita
OKLAHOMA—Duncan, Oklahoma City, Pauls Valley, Sapulpa, Seminole
TEXAS—Borger, Dallas, Odessa, Pampa

THE BOVAIRD SUPPLY CO.

GENERAL OFFICES: TULSA, OKLAHOMA

Why NATIONAL SEAMLESS gives you most for the money . . . with these two exclusive features

National Seamless Casing produced by National Tube Company's warm working process provides the petroleum industry with high strength casing having the uniformity of physical properties so long desired. In the warm working process the final reduction to size, ranging up to some eight per cent of the diameter, is made at a closely controlled temperature, between the blue brittle range and the lower critical temperature. The result is casing with uniformly high transverse compression and longitudinal physical properties. The increased transverse compression strength leads to high collapse resistance and the increased longitudinal tension strength to increased joint strength.

National Deoxidized Bessemer Steel Casing and Tubing. The development of deoxidized Bessemer steel by National Tube was a natural consequence resulting from intensive studies in steel-making practices to develop a better steel for pipe manufacture. National Tube is the only manufacturer of fully deoxidized Bessemer steel suitable for pipe manufacture. Seamless pipe made from this special steel is peculiarly suited for oil producing work due to its having a combination of high yield strength and good ductility. This type of oil well casing and tubing is produced in the A.P.I. H-40 grade and the J-55 grade.

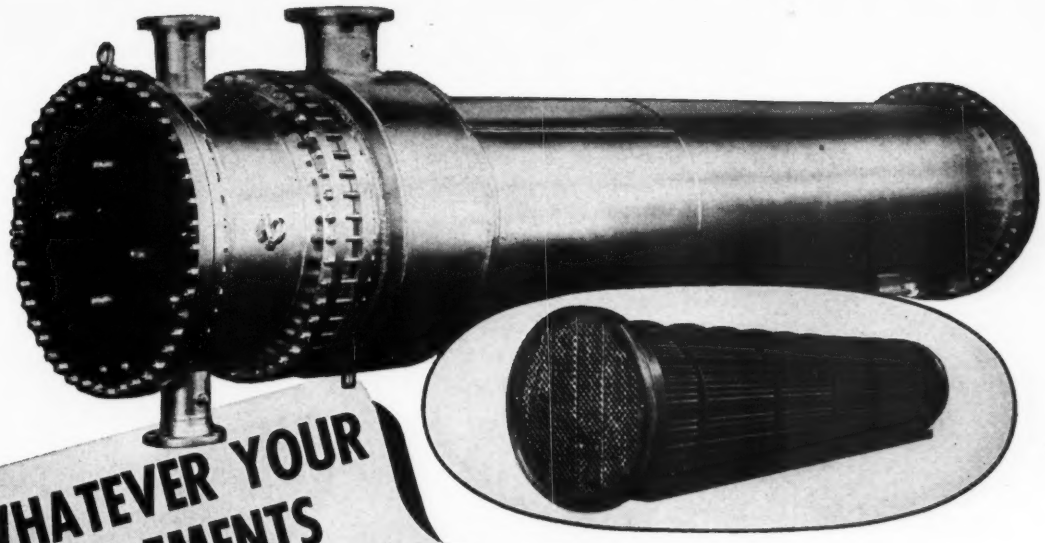
For the latest information on U·S·S NATIONAL Seamless Drill Pipe, Casing, and Tubing, write to National Tube Company, Frick Building, Pittsburgh 19, Pennsylvania. Ask for Bulletin No. 15.

NATIONAL TUBE COMPANY

PITTSBURGH, PA.

United States Steel Export Company, New York

UNITED STATES STEEL



WHATEVER YOUR REQUIREMENTS for a TUBULAR HEAT EXCHANGER

You'll find an exactly suitable G-R design

- Whatever the SERVICE . . . *cooling* . . . *heating* . . . *condensing* . . . *heat exchange;*
- Whatever the OPERATING CONDITIONS . . . *pressure* . . . *temperature* . . . *capacity;*
- Whatever the FLUID . . . *liquid* . . . *gas* . . . *vapor* . . .

G-R has the right design and construction of tubular unit for every requirement, based on more than three-quarters of a century of specialized experience in building heat transfer apparatus, and the results obtained in many hundreds of thousands of installations.

G-R designs include units with floating heads, fixed heads and U-tubes . . . stationary heads with separate and integral tube sheets . . . bare and finned tubes . . . bladed, orifice, and segmental type transverse baffles . . . welded, packed and adjustable longitudinal baffles for two-pass shell . . . and various types of stationary head closures.

G-R tubular heat exchangers include exclusive features that assure leak-proof joints between passes in stationary and floating heads, lastingly tight tube joints, effective use of shell space for greatest heat transfer, convenience of inspection and lowest maintenance expense.

In addition, G-R recommendations are *impartial* as well as *authoritative*, because of the unequalled variety of heat transfer apparatus which has been developed by the G-R engineers.

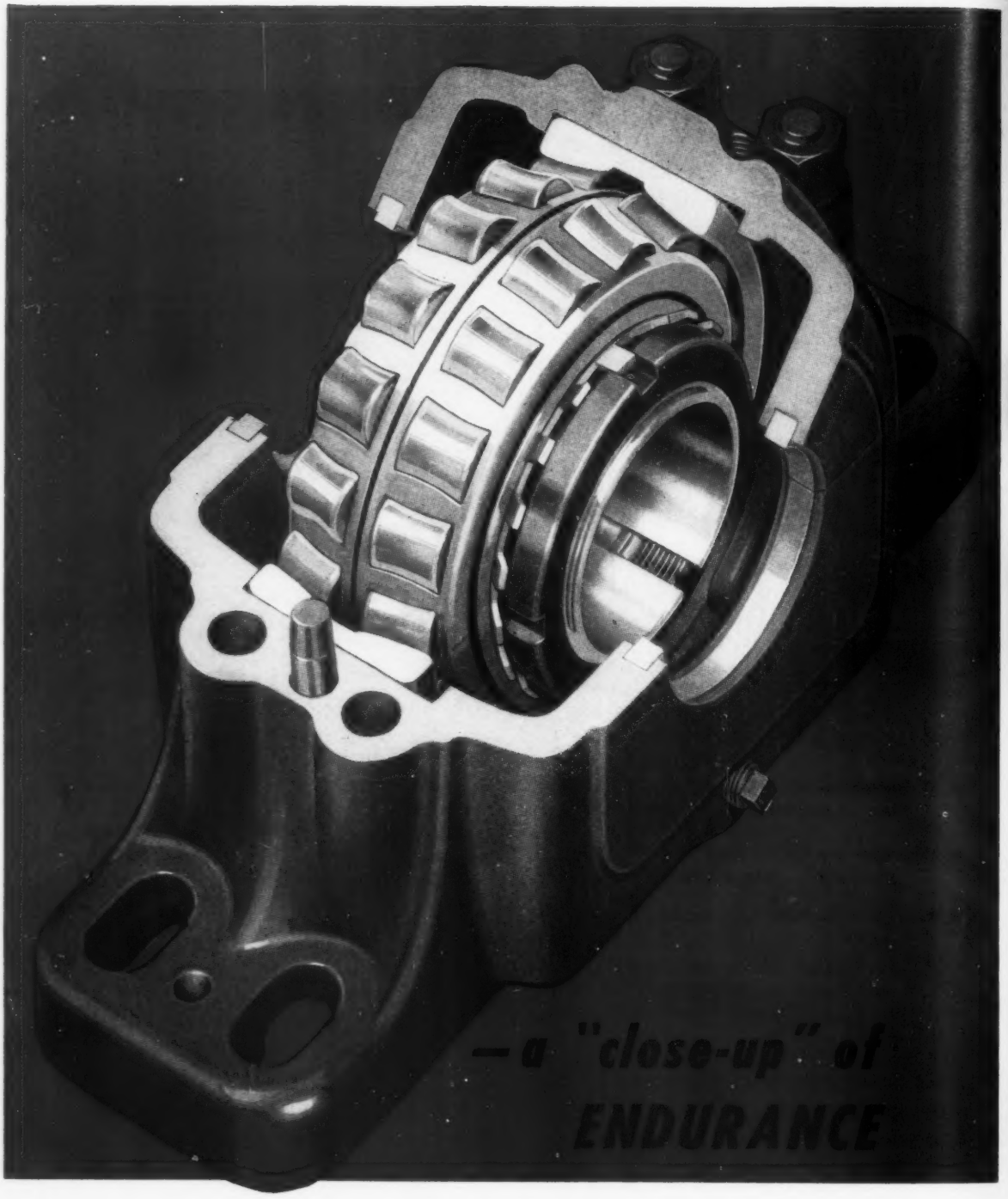
This impartial, authoritative advice is offered without charge or obligation. Write for recommendations on *any* heat transfer service in which you are interested.

THE GRISCOM-RUSSELL CO.
285 Madison Avenue • New York 17, N. Y.

GR-126

GRISCOM-RUSSELL

Pioneers in Heat Transfer Apparatus



Good bearing design calls for combination of the ultimate in precision with ruggedness of construction. Link-Belt designers, who know the problems of power transmission best, have created a line of ball and roller bearings which will serve you well and longer. May we send catalogs?

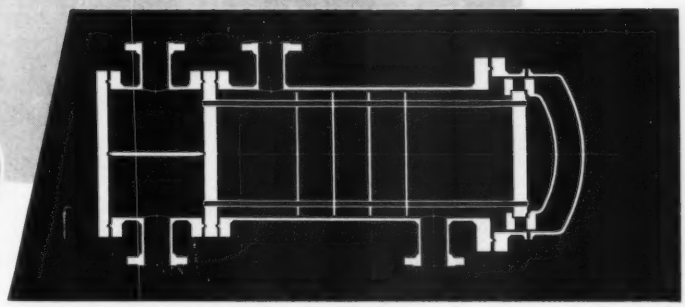
11,257-A

LINK-BELT COMPANY Indianapolis 6, Dallas 1, Houston 2, Kansas City 6, Mo., Los Angeles 33, New York 7, Toronto 8. Offices, Factory Branch Stores and Distributors in Principal Cities.

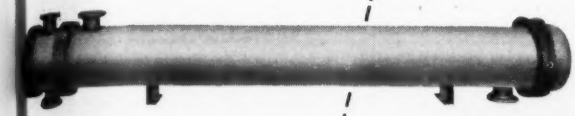
LINK-BELT *Ball and Roller BEARINGS*

WESTERN

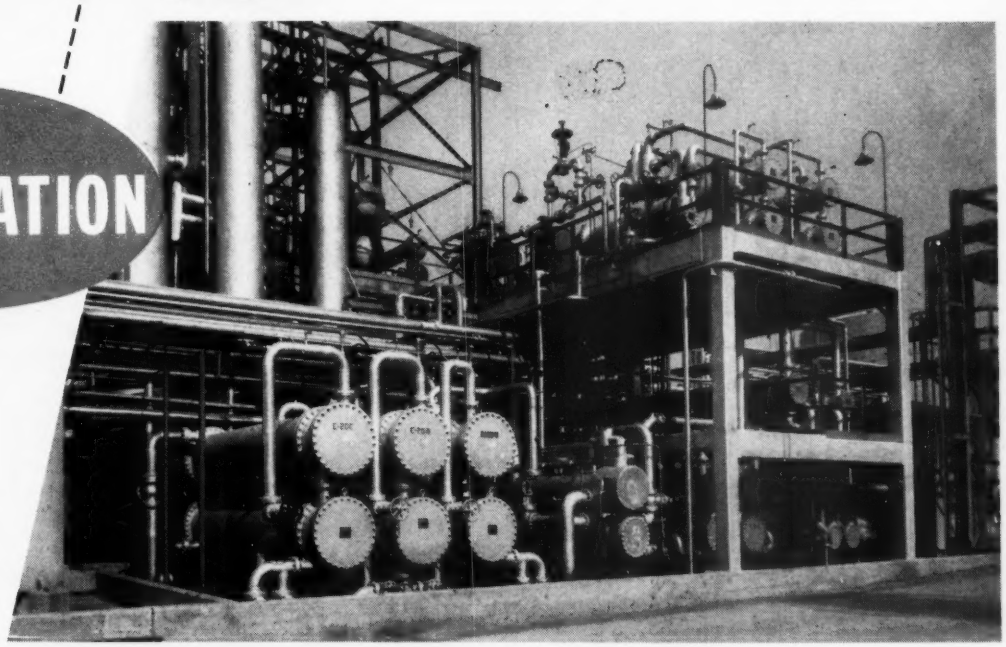
Floating Head Exchangers



from DESIGN



to INSTALLATION



Careful attention to detail, from the blueprint stage through the final installation of the unit, is paramount in all Western heat transfer equipment. Typical of such engineering service is the installation pictured above, where, working with Process Engineers, Inc., Western Exchangers were furnished for Sun Oil Company's Marcus Hook, Pa., plant.

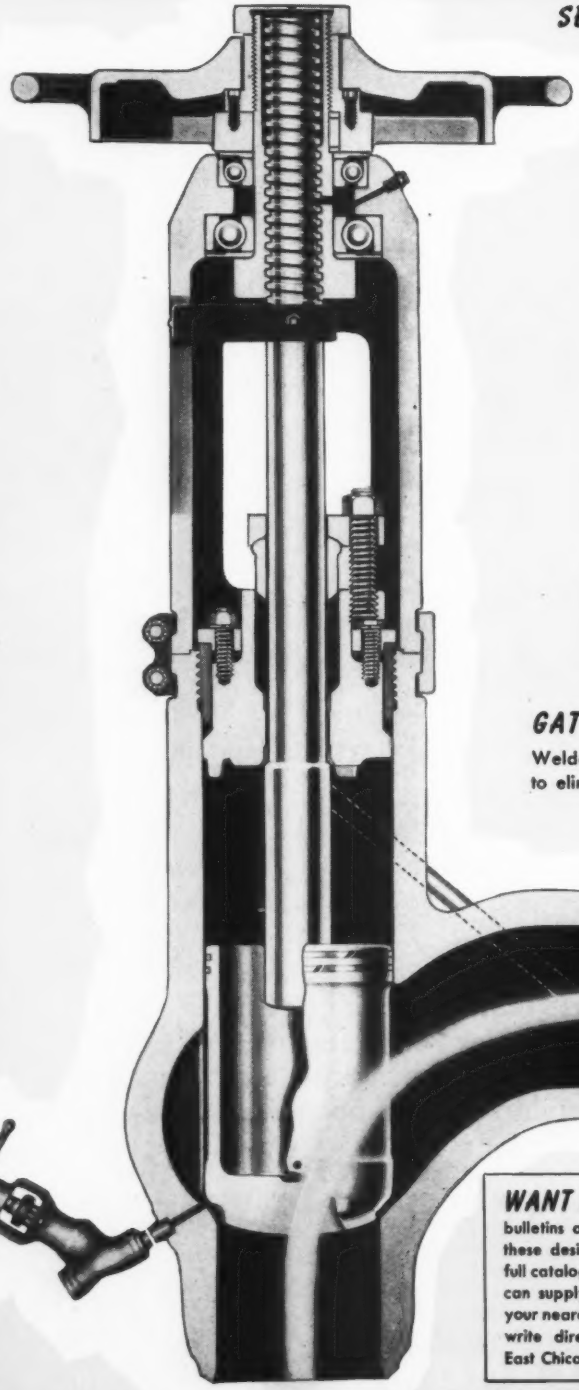
Western's complete engineering and manufacturing facilities are at your disposal for your future heat transfer requirements. And — to help your engineering and purchasing departments with heat transfer estimating, send for our newly published booklet—"Men-Machinery-Materials."

WESTERN SUPPLY CO.

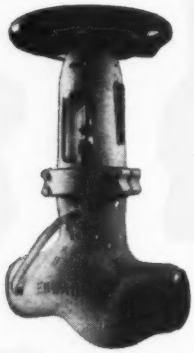
P. O. Box 1888 **TULSA, OKLAHOMA** Phone: 8211 - L.D. 243

They're New!

NEW PRESSURE SEAL BONNET VALVES.. NEW FORGED STEEL GLOBE VALVES.. NEW IMPACTOR HANDWHEEL NEW GAGE



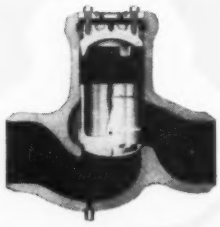
SELF-SEALING BONNET JOINTS, 30% MORE FLOW



Now you can get Edward pressure-seal bonnet valves in gate, globe or angle patterns for stop, check or non-return service. New features for lower and lower pressure drop have been built in—and **proved.** On no other valve series is there more proven flow data

EDWARD PATENTED EVALTHRUST YOKE BUSHING

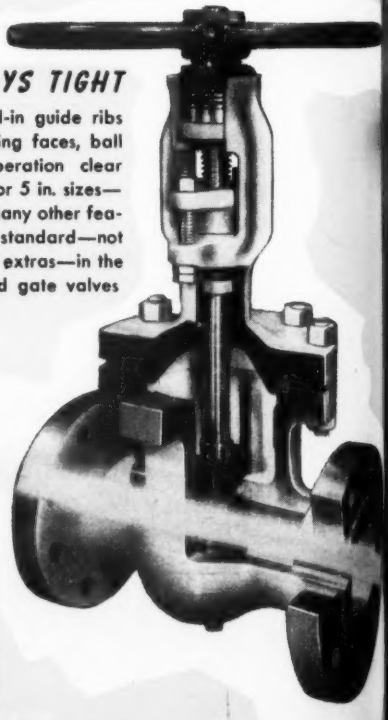
and Impactor handwheel for easiest closing in cramped locations is standard on stop and non-return series. So is closure indicator.



ON CHECK VALVE, left, and non-return valve, far left, note new enclosed dash-pot disk, Edward Equalizer for high disk lift and free flow passage. The whole series is regularly built in chrome-moly steels for stability at high temperatures.

GATE VALVE THAT STAYS TIGHT

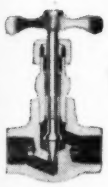
Welded-in Stellited seats, welded-in guide ribs to eliminate wedge drag on seating faces, ball bearing operation clear down to 4 or 5 in. sizes—these and many other features are standard—not added cost extras—in the new Edward gate valves



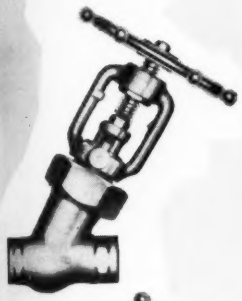
WANT MORE DATA? Special bulletins are now available on most of these designs. A few are so new that full catalog data isn't ready yet, but we can supply dimensional drawings. Ask your nearest Edward representative, or write direct to Edward Valves, Inc., East Chicago, Indiana.

A WHOLE NEW GROUP of Edward Steel Valve Designs

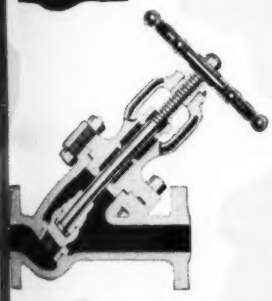
NEW GAGE VALVES.. NEW WELDED BONNET UNIVALVES.. NEW BLOW-OFF VALVES... NEW GATE VALVES



FINE REGULATION ON GAGE LINES For gage and meter service, the redesigned Edward Fig. 152 valve gives close flow regulation with small seat port and longer seat-stem contact area. New form fitting T-Handle. Rated 4000 lb W.O.G. Also in 12% Cr. and 18-8 stainless steels.



ALL-PURPOSE SMALL GLOBE VALVE Here's a new O. S. & Y., union bonnet, bolted gland forged steel globe valve for a multitude of services. Packing adjustment or replacement greatly simplified. Rated 800 lb, 750 F.



BLOW-OFF FLEXIBILITY A new series of 300 lb O. S. & Y. blow-off valves with all the design features of high pressure valves. Install them in any position for greatest piping flexibility.

Boiler blow-down installation, 1500 lb 1000 F with new Edward welded-bonnet straightway blow-off valves. Compact, tight, easy to open and close with new Impactor handwheel.

NEW, EASIER CLOSING Now the Edward Impactor handwheel, modernized and improved, is available on many small valves as well as large. Easy-to-grip cross bar delivers 2.8 times the closing load of ordinary handwheels. No wrenches or extension bars needed.

NEW WELDED-BONNET UNIVALVE

Already lowest in pressure drop among forged steel globe valves, Edward patented welded bonnet Univalves have been modified to give even less resistance to flow, less wear-producing turbulence. For top temperature service and up to 2500 lb pressure, here is the valve that offers the most.

Edward Valves, Inc.

SUBSIDIARY OF ROCKWELL MANUFACTURING CO. EAST CHICAGO, INDIANA

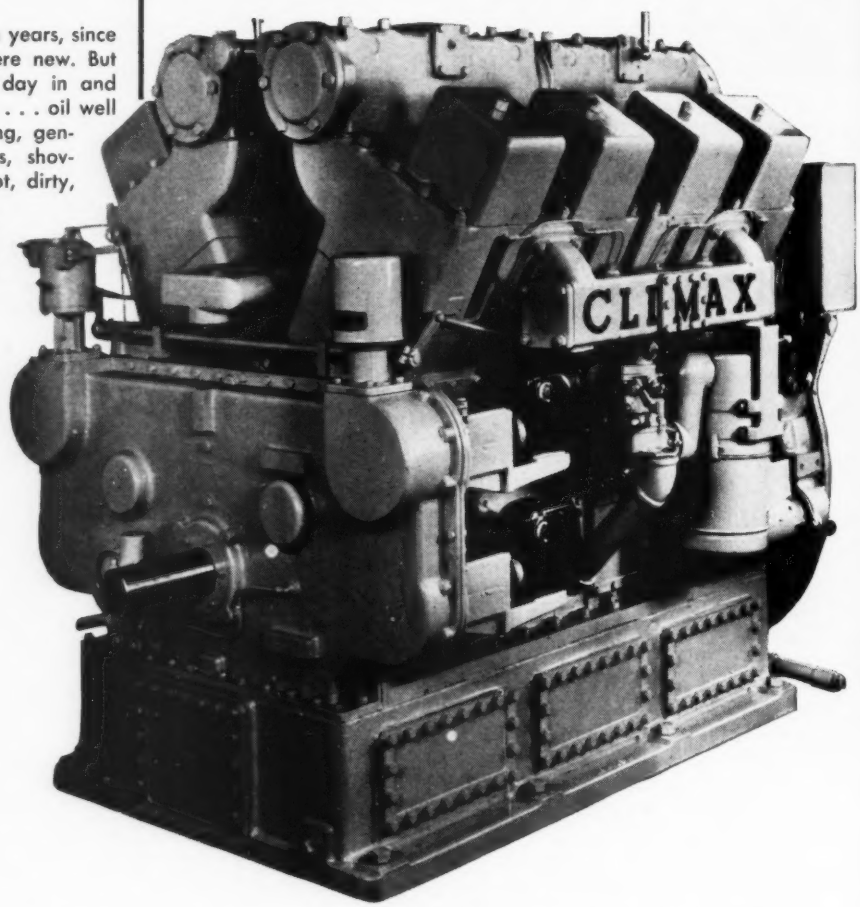
SEE THEM AT THE POWER SHOW

These new designs, and many other Edward and Nordstrom lubricated plug valves too, will be on display at the Edward booths, No. 26 and 27 at the Power Show, Grand Central Palace, New York, Nov. 29 to Dec. 4.

TICKING OFF THE HORSEPOWER . . .

● It's been months, even years, since many Climax engines were new. But they're still on the job, day in and day out. Tough jobs, too. . . . oil well drilling, pipe line pumping, generating electricity, cranes, shovels, water pumps . . . hot, dirty, bone-wearying work. It's Climax tradition to do the job without complaint . . . and come back for more.

● Climax engines, built better-than-ever to this tradition, are ready to help you get greater power with more economy. Solve your power problem today. . . .



Pick Up Your Phone . . .

call for climax BLUE STREAK V-8 ENGINE

● **Select the Climax Engine that does your job best from the complete line of V-series engines (8 or 12 cylinders) and the In-line series (4, 6 or 8 cylinders).**

Five outstanding features make the new Climax V-8 Engines superior on the job . . . where results count most. ● Great power in small space ● Exclusive Hi-Power Blue Streak Combustion ● Hi-Efficiency Carburetion ● Easy Starting ● Abundant, unfailing power delivery. Learn for yourself how Climax engines can do your job better, at low cost. Call your nearest Climax man today . . . or write the general sales office for complete, detailed information.

EXECUTIVE & GENERAL SALES OFFICES:
Power & Light Bldg., Kansas City 6, Mo.

ENGINE PLANT
Clinton, Iowa

INSTRUMENT CONTROL PLANT
Tulsa, Okla.

REGIONAL OFFICES:
Dallas, Tex., Los Angeles, Calif., Chicago, Ill.

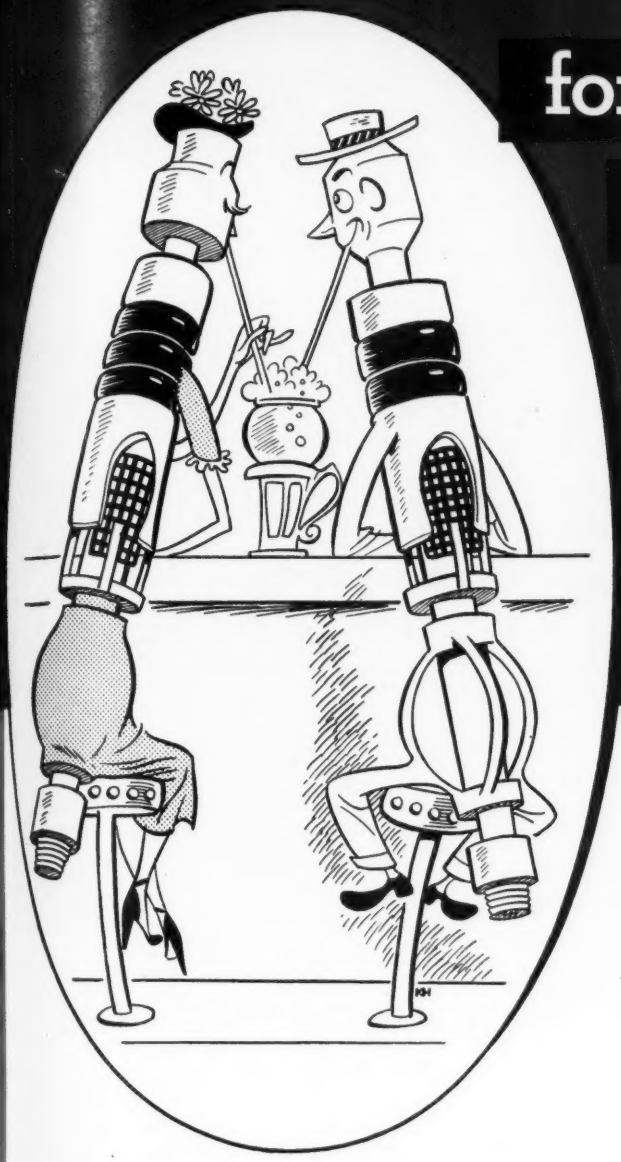
SERVICE BRANCHES:
Dallas, Tex
Shreveport, La.
Phoenix, Ariz.
Corpus Christi, Tex.
Odessa, Tex.
Oklahoma City, Okla.
Los Angeles, Calif.
Fort Worth, Tex.
Eloy, Ariz.

REPRESENTATIVES IN ALL MAJOR CITIES

CLIMAX ENGINEERING CO.

EXECUTIVE & GENERAL SALES OFFICES
Power & Light Bldg., Kansas City 6, Mo.

Climax Engineering Co. ENGINE DIVISION



for inducing tubing flow

Packers used for inducing tubing flow, or any other production installation, are apt to stay in the well quite a while... a good test of the packer's stamina. That's why Lane-Wells Packers are designed and built with *two* ideas in mind: First, to provide positive packoff *when* and *where* you want it, *as long* as you want it; second, to release easily when pulled, coming out without wrecking themselves on the way. Since packers aren't found on dime-store counters, both points are important.

You can't do that with mirrors... real oil country knowledge and experience designed Lane-Wells Packers with these features:

FLOSEAL PACKING RING ASSEMBLY gives positive packoff under differential pressures up to 7,000 P.S.I. and temperatures as high as 300°F. The rings spring back to shape when released—won't vulcanize to casing—resist heat and pressure.

FLOPAK VALVE SEALS operate even with junk on the seat—won't vulcanize to the seat—withstand heat, abrasion and well fluids.

DOVETAILED SLIPS ride in undercut grooves in the cone—can't drag, hang up, catch in collars or come out.

CROSS-CUT WICKERS hold on hardest casing—won't shave, can't clog.

LANE WELLS

for Packers

Offices and Plant: 5610 SO. SOTO STREET, LOS ANGELES 11, CALIFORNIA

24 HOUR SERVICE • 45 BRANCHES

LOS ANGELES • HOUSTON • OKLAHOMA CITY

Life-Line
OLD
Usual slot design is rectangular, with sharp corners into which slot cell insulation must be creased and coils must be pushed.
NEW
Life-Line slot design is pear-shaped. Coil slips in easily and fills slot—no corner voids remain to collect dirt and moisture.

NEW

An electr
"sinews",
the stator
If these
while bei
or moist
breaks do
motor fail
Life-Lin
these com
shaped sl
without s
slot corne
insulation

OLD

Rectangul
many unfil
dust and
ulate and

NEW

Pockets ar
sulation is
ered by w
ing of ins

NEW METHODS . . . NEW MATERIALS . . . OPEN WAY TO LONGER ELECTRIC MOTOR LIFE

An electric motor's "muscle" consists of the "sinews", or coils of wire, packed into slots in the stator of the motor.

If these are "bruised", or cramped or damaged while being put in—or if spaces are left for dirt or moisture to gather—protective insulation breaks down and electrical failures result. *Most motor failures are caused in this way.*

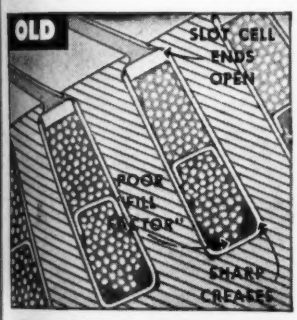
Life-Line—industry's all-steel motor—overcomes these common causes of motor failure. New, pear-shaped slots enable coils to be slipped into place without stress, eliminating need for tapping. No slot corners are left to require creasing of the slot insulation, nor to gather dirt in these voids.

New electrical design is just one of the benefits Life-Line motors bring to builders and users of motor-driven equipment. Get the details on Life-Line's smaller size, lighter weight, greater strength and smoothness.

Life-Line motors, now built in sizes from 1-15 hp, are available from stock in standard and near-standard types. "Specials" in Life-Line design are available on short shipment. Other sizes and types—up to 200 hp—soon will be changed over to modern Life-Line design. Check your nearest Westinghouse office for deliveries—or write or wire today to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna.

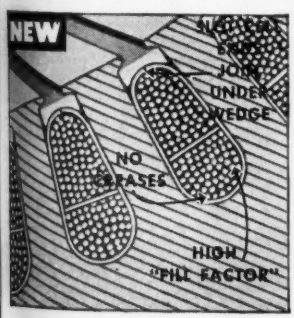
J-21456

Westinghouse PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE **Life-Line motors**

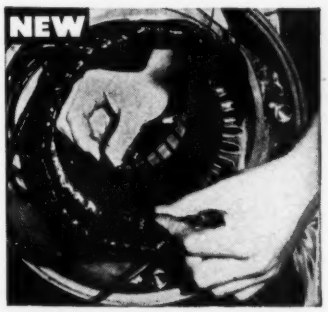


Rectangular slot design leaves many unfilled pockets for dirt, dust and moisture to accumulate and cause deterioration.

Old slot shape frequently required tapping last wires of the coil into position with resulting possible damage or weakening of insulation.



Pockets are eliminated—cell insulation is lapped over and covered by wedge. No sharp creasing of insulation is necessary.



Life-Line "pear-shaped" slots permit coils to be inserted snugly into position without need for tapping or weakening of the insulation.

THE LIFE-LINE OIL WELL pumping motor has been specifically designed for exposed locations encountered in oil well pumping service. Longer life on the job with freedom from electrical failures is assured by Life-Line manufacturing methods and new insulating materials.

NUMBER 1 OF A SERIES PRESENTING:

Pacific's Proved Performance

in years of uninterrupted service!

In January 1938 Wilshire Oil Company installed a 4-inch, 8-stage PACIFIC PUMP, Type ITB, Serial Number 4445. Following good practice, this pump was thoroughly inspected and checked in January 1939 and then returned to service.

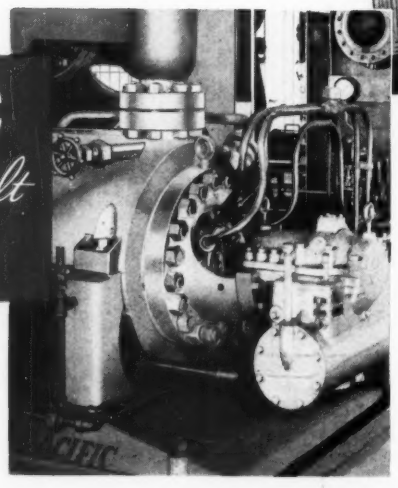
Look at the Log:

From January 1939 to March 1948 this PACIFIC PUMP was on stream a total of 62,789 hours...delivered 31,000,000 bbls. of 600°F. oil against a discharge pressure of 800 p.s.i.g. THAT'S PACIFIC DEPENDABILITY!

During this same period the stuffing boxes were repacked 5 times and, in April 1946 one new shaft sleeve was installed...PACIFIC PUMP maintenance cost from January 1939 to March 1948 was only .0164¢ per 1000 lbs. of oil pumped. THAT'S PACIFIC ECONOMY!

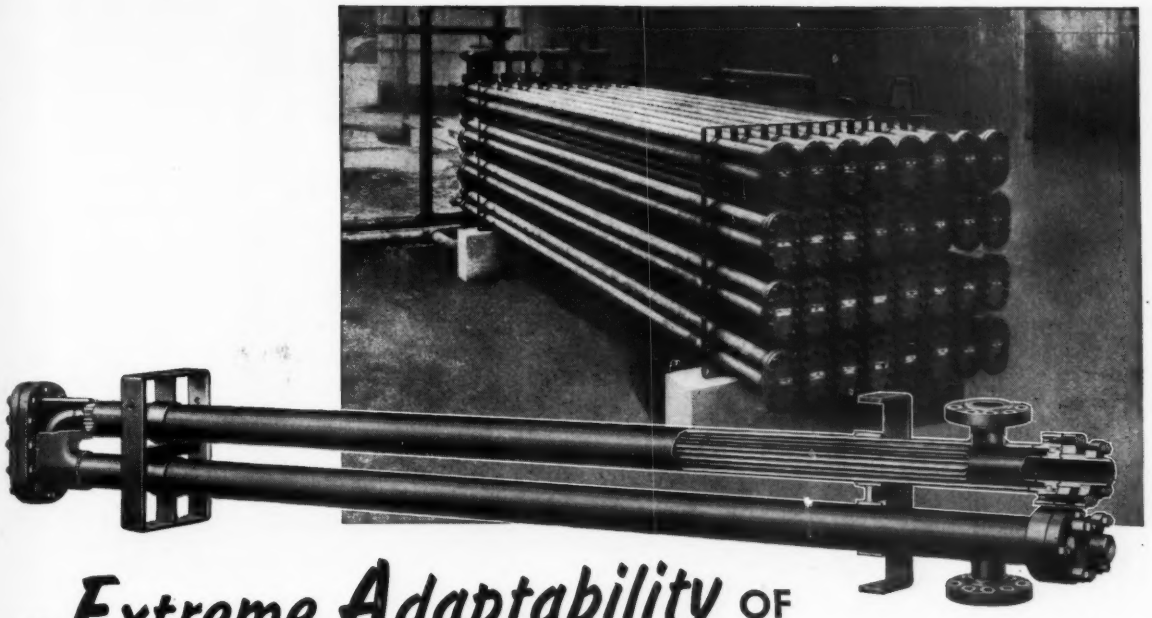
Because this PACIFIC PUMP had not been opened for inspection during its many years of continuous service, it was deemed advisable to check the interior clearances and replace parts if necessary. The check was made during the March turn-around and the pump returned to service to continue its outstanding performance record. THAT'S PACIFIC SERVICE!

PACIFIC *Precision Built* **PUMPS**



PACIFIC PUMPS INC.
Huntington Park, California
One of the Dresser Industries
Export Office:
Channin Building, 122 East 42nd Street, New York
Offices in All Principal Cities

PR-4



THE *Extreme Adaptability* OF

BROWN FINTUBE SECTIONAL HAIRPIN HEAT EXCHANGERS

Enables users to keep production abreast of changing market and seasonal conditions

● Unlike "bundle" type exchangers, which are custom built for a definite and fixed duty, Brown Fintube Sectional Hairpin Heat Exchangers give operating men almost unlimited flexibility to meet changing requirements. The capacity of the bank can be increased by adding additional sections to the original installation. Capacity can be decreased by valving off one or more of the parallel streams,—or reducing the number of sections in each stream. The entire bank can be changed from one duty, to another and totally different duty, by remanifolding the sections in different series-parallel arrangement. And the bank can even be disassembled, and the sections then reassembled as two or more smaller exchangers on different duties, in different plants.

Let us help you in adapting Brown Fintube Sectional Hairpin Heat Exchangers—with their many outstanding operating and maintenance advantages—to your next heat transfer requirement. The Brown Fintube Co., Elyria, Ohio. Sales engineers in the principal cities.

8 ADVANTAGES

BROWN FINTUBE
Sectional Hairpin
HEAT EXCHANGERS

1. Flanged Shell Seal and Flanged Union Head End Assembly.
2. Extreme Adaptability to Meet the Requirements of Changed Duties.
3. No Obsolescence.
4. Easy Inspection and Maintenance
5. Continuous Operation. No Shut Downs for Servicing.
6. Minimum Investment in Replacement Parts.
7. The Brown Resistance Welded Integrally Bonded Fintube.
8. Easily Removed Rear End Cover Plate.

Write today for Bulletin No. 481. It gives full details

BROWN FINTUBE

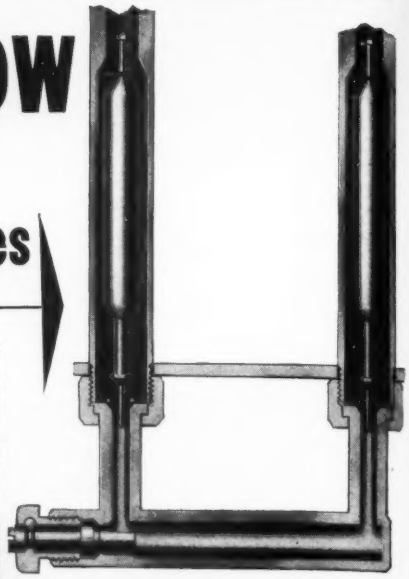
Sectional Hairpin

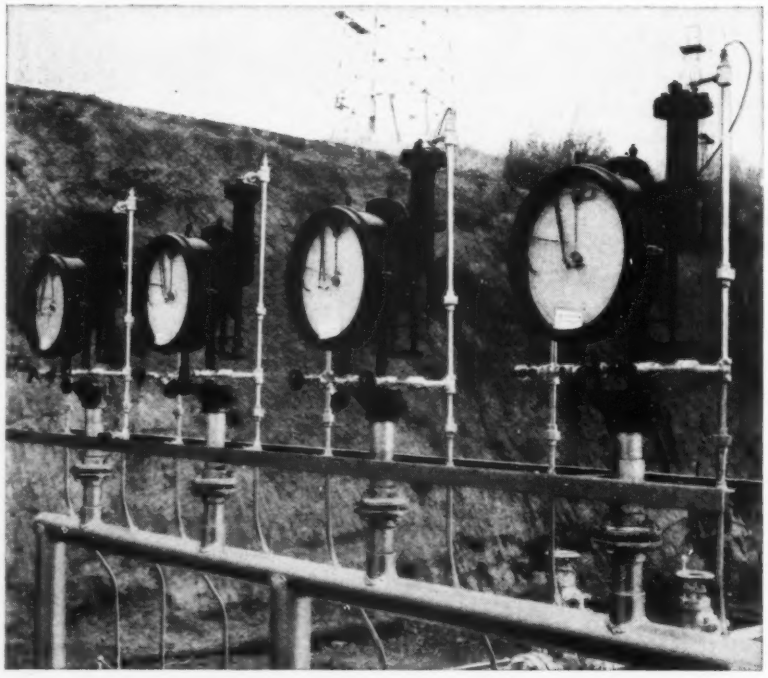
HEAT EXCHANGERS

RESISTANCE WELDED INTEGRALLY BONDED FINTUBES AND FINTUBE HEAT TRANSFER PRODUCTS

MERCURY CAN'T BLOW

. . . when protected by these Mercury-submerged Check Valves





Blowing or emulsifying mercury is a needless waste. One blow can and often does shoot all the mercury in a meter . . . to say nothing of interrupting service, missing records and losing time to refill and recalibrate the meter. One large company reported a cost of $40 annually per meter for mercury-makeup, before changing to Foxboro Flow Meters.

The submerged check valves in every Foxboro Orifice Meter positively prevent mercury blowouts no matter how suddenly the meter may be overranged or by what cause . . . freezing, stoppage, leaks, faulty manipulation or flow reversal. They check blowing of mercury up to an overrange equivalent to the working pressure of the meter.

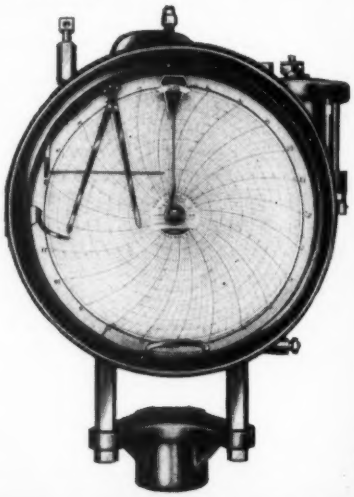
This performance has been so successful in eliminating trouble and expense in the gas field that most Flow Meters . . . for service requiring high and sustained accuracy . . . are by Foxboro.

When you specify Foxboro Flow Meters, you're sure of getting meters that offer the lowest cost in the long run. Now is a good time to be cashing in on them. Write for Bulletin 351. **The Foxboro Company, 60 Neponset Avenue, Foxboro, Massachusetts, U. S. A.**

6 OTHER REASONS FOR SPECIFYING FOXBORO FLOW METERS . . .

1. *Inherent accuracy*
2. *Freedom from mechanical errors and errors of angularity*
3. *Extra powerful float action*
4. *Practically frictionless movement*
5. *Simple, rugged construction*
6. *Ease of servicing*

. . . the results of exclusive design features plus 38 years of engineering "know-how".

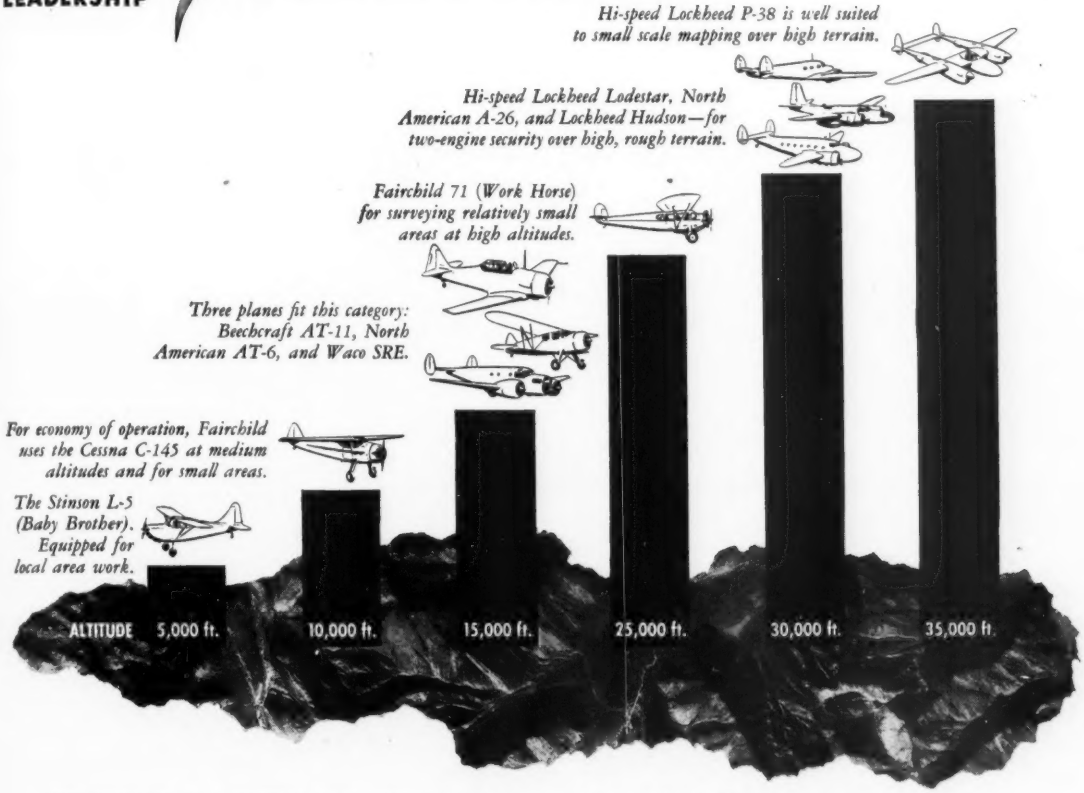


FOXBORO
REG. U. S. PAT. OFF.

DIFFERENTIAL-TYPE FLOW METERS

FACTS ABOUT FAIRCHILD LEADERSHIP

organized from the ground up for dollar-wise planning


Hi-speed Lockheed P-38 is well suited to small scale mapping over high terrain.
Hi-speed Lockheed Lodestar, North American A-26, and Lockheed Hudson—for two-engine security over high, rough terrain.
Fairchild 71 (Work Horse) for surveying relatively small areas at high altitudes.
Three planes fit this category: Beechcraft AT-11, North American AT-6, and Waco SRE.
For economy of operation, Fairchild uses the Cessna C-145 at medium altitudes and for small areas.
The Stinson L-5 (Baby Brother). Equipped for local area work.
ALTITUDE
5,000 ft.
10,000 ft.
15,000 ft.
25,000 ft.
30,000 ft.
35,000 ft.

THE AIRPLANE IS A CRITICAL COST FACTOR in all aerial mapping projects. Every survey has its unique requirements. Seldom are conditions the same. To make certain your project is flown economically, accurately, and quickly . . . Fairchild maintains a "Flying stable" of fully-equipped planes for all types of aerial mapping procedures.

WHEN PLANNING A SURVEY, start the right way with Fairchild engineers at your conference table. Their help in the early stages will cut costs for your long-range plans. No obligation for preliminary consultation. Write today on your professional letterhead or your company's . . . for the new Fairchild booklet, *Focusing on Facts.*

FOR BETTER MANAGEMENT AND ENGINEERING, base your long-range plans on Fairchild's aerial mapping service.

For Industry, Commerce and Public Works

Since 1920, Fairchild has served clients the world over . . . conducting domestic and expeditionary aerial surveys in the fields of:

Petroleum	Highways	Taxation
Mining	Railroads	Harbors
Geology	Traffic	Flood Control
Forestry	Utilities	City Planning
Water Ways	Pipe Lines	Legal Evidence

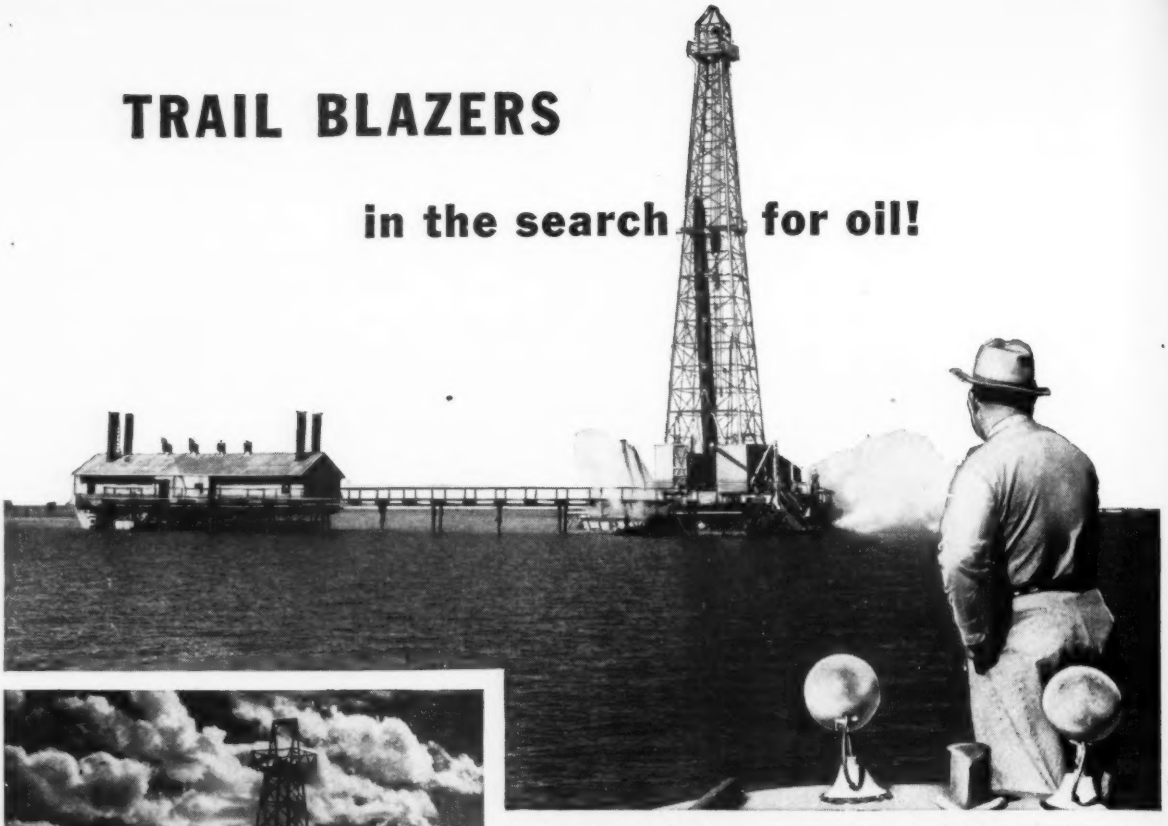
Fairchild **AERIAL SURVEYS, INC.**

Photogrammetric Engineers

224 E. 11th ST., LOS ANGELES 15, CALIF. • 21-21 FORTY-FIRST AVE., LONG ISLAND CITY 1, N. Y. • 73 TREMONT ST., BOSTON 8, MASS.

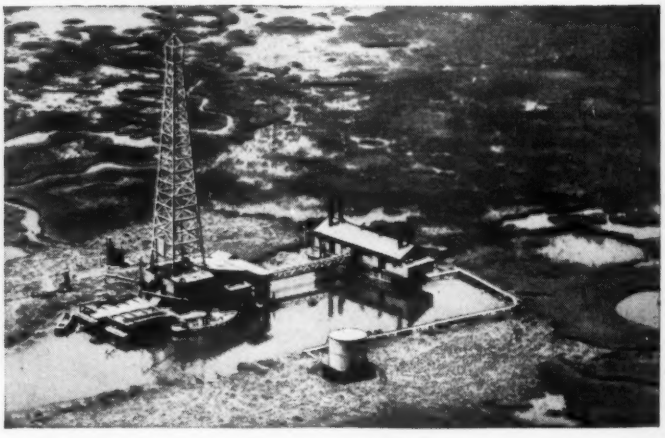
TRAIL BLAZERS

in the search for oil!



A submersible drilling barge on the Gulf Coast—this type of underwater drilling operation was developed by The Texas Company and adopted by the industry . . . another Texaco contribution to the vital search for oil.

Highest oil field in the U. S., with wells up to 8,378 feet above sea level, is at Wilson Creek, Colorado. Crude from this mountain field helps meet the demands of Texaco's far flung refineries.



One of the world's deepest producers, is Texaco's Lafourche Basin Levee, District No. 1 in the Queen Bess Island area in Louisiana. Total depth of this record breaker is 15,523 feet. Texaco stands near the top of the list of companies engaged in deep drilling.

To help meet the growing need for oil, The Texas Company is boosting exploratory work . . . building new research facilities . . . supporting expansion in synthetics . . . assisting in the development of foreign fields to reduce drain on U. S. crudes . . . and promoting consumer conservation.

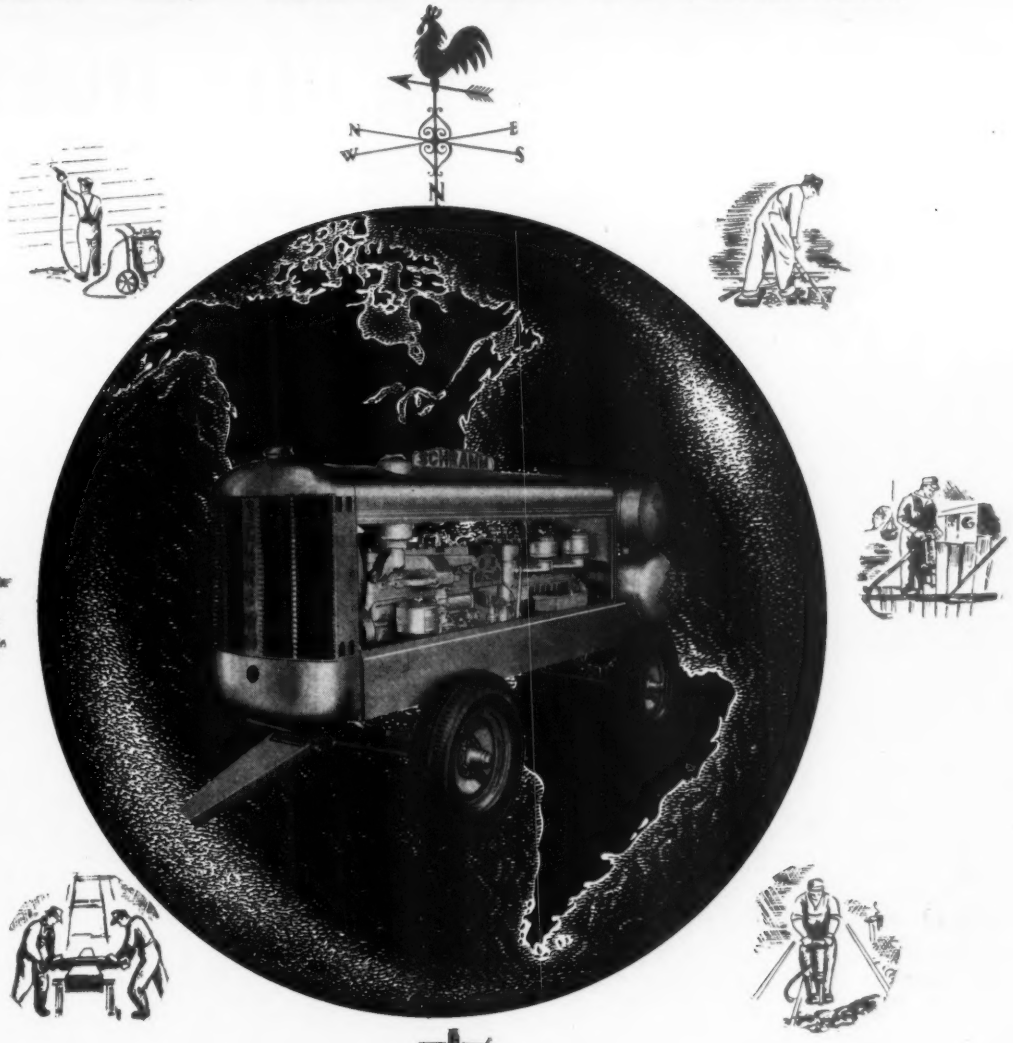
THE TEXAS COMPANY

Petroleum Promotes Progress

TEXACO

REG. T. M.

NORTH • EAST • SOUTH • WEST • IT'S SCHRAMM!



DOING JOBS LIKE THESE . . . throughout the Construction Field!

Rock Drilling	Trench Digging	Spray Painting	Tie Tamping
Concrete Breaking	Driving Sheet Pile	Sand Blasting	Timber Sawing
Demolition	Backfill Tamping	Spraying Cement	Riveting

At almost every turn you need compressed air!

The above check list indicates some of the many compressed air jobs to be done, all of which are accomplished easily, quickly and economically with Schramm Air Compressors.

Here's *why* you profit, as others have, by using Schramm: they're compact, lightweight, easy to start; built for rugged jobs, to provide a continuous flow of air.

Important features include 100% water cooled; mechanical intake valve; forced feed lubrication and easy, electric push-button starting.

Performance everywhere has proved Schramm Air Compressors can do any compressed air job you require. Write today for list of models and sizes.

TOOLS for the JOB

Schramm Inc. also has a complete line of Pneumatic Tools to offer and recommend for operation by their Compressors.

These include Rock Drills, Paving Breakers, Trench Diggers, Clay Spades, Backfill Tampers, Tie Tampers, Sheeting Drivers, Demolition Tools, Chain and Circular Saws.

Write for bulletins and prices.

SCHRAMM INC.

THE COMPRESSOR PEOPLE • WEST CHESTER • PENNSYLVANIA

PROGRESSIVE ADVANCEMENT ••• YESTERDAY, TODAY and TOMORROW

BARE PIPE STOCK
PILED AT OUR PLANT

HILL, HUBBELL

COATING and WRAPPING FEATURES

← STOCK PILING AT PLANT

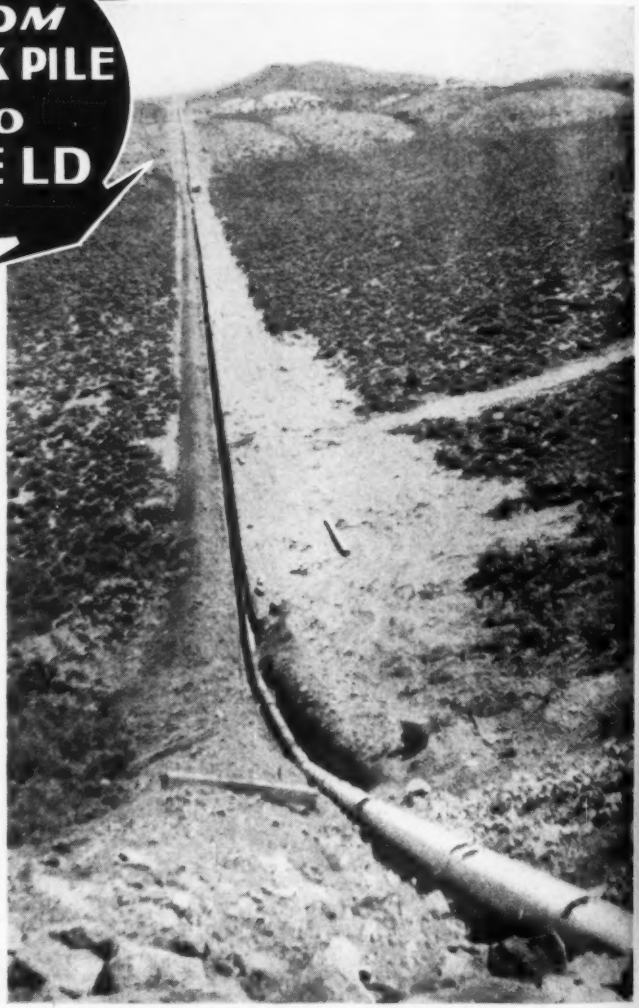
← SCHEDULED SHIPPING

↓ SPECIAL FIELD SERVICE

FROM STOCK PILE TO FIELD

HILL, HUBBELL service includes stock piling of YOUR bare pipe order as it is produced by the pipe mill; also scheduled coating and wrapping of the pipe to coincide with your stringing requirements, thus avoiding the additional handling of the pipe at destination.

HILL, HUBBELL coating and wrapping facilities for handling ¾" nominal to 30" O. D. pipe in short or long installations, are at your service.



COATED AND WRAPPED STEEL PIPE DELIVERED IN ACCORDANCE WITH YOUR SCHEDULE.

Hill, Hubbell and Company

Division of GENERAL PAINT CORPORATION

3091 MAYFIELD RD., CLEVELAND, OHIO.

. . . being held up by unnecessary condenser tube failures. Consult your near-by Jones & Laughlin Supply store about Revere Arsenical Admiralty Condenser Tubes. You'll find they are practically 100% resistant to "dezincification" attack and inter-crystaline corrosion. Other advantages such as exceptional rolling-in quality make Revere Tubes big money savers and "down time" eliminators. Stocks of copper, brass and steel tubes along with cutting and burring facilities are maintained at our Tulsa and Houston stores.

EXPORT: 230 Park Avenue, New York 17, N.Y., U.S.A.

JONES & LAUGHLIN SUPPLY COMPANY

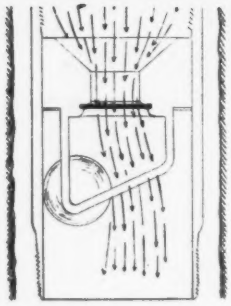
Subsidiary of Jones & Laughlin Steel Corporation

TULSA, OKLAHOMA

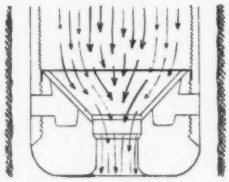
J&L STEEL

ONLY Cameron-Nuwell gives you positive DIRECTIONAL FLOW CEMENTING!

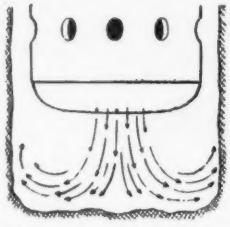
FULL FLOW DOWNWARD WHILE RUNNING CASING



When pump pressure is applied, the plastic ball . . . which floats in cement . . . moves down and to the side in a slotted cage, out of the direct path of fluid and cement slurry.

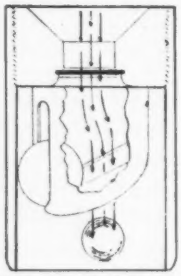


Note that while running casing, there are no openings in the side of the shoe to endanger plugging the shoe with shale or cavings. Full flow is directed downward.

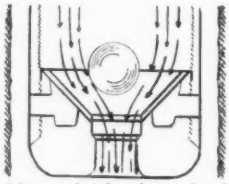


When you encounter a bridge in open hole, the high velocity downward flow quickly and easily washes away the obstructions. Pump pressure can be increased or decreased at will, with full flow downward.

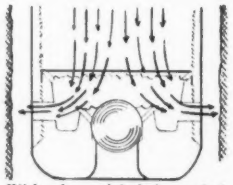
FULL FLOW LATERALLY WHEN CEMENTING



The smaller diverter ball readily passes through the back-pressure valve cage on the way to its seat in the nose of the shoe.



After casing has been placed and the downward flow through the nose of the shoe becomes a detriment rather than an aid, the diverter ball moves into position to seal the axial hole.



With the axial hole sealed, pump pressure shatters the diaphragm which has sealed off the lateral ports. The nose of the shoe is closed. Full flow is now directed through evenly spaced side ports against walls of the hole.

With the Cameron-Nuwell directional flow cementing principle, you are assured a good cement job *every time* with a full column of cement entirely around the pipe. This full . . . *not partial* . . . downward and lateral flow which *only* Cameron-Nuwell provides, assures more successful primary cement jobs with fewer squeeze jobs. Write now for full mechanical details of the only equipment that gives you positive directional flow cementing . . . CAMERON-NUWELL.

Cameron
IRON WORKS, INC.
P. O. BOX 1212 HOUSTON, TEXAS

Exports: 24 Texas Ave., New York, N. Y. Telephone: 42 Thompson Bldg., Tulsa (Telephone 28870). Gulfcoast Bldg. (P. O. Box 2467). Wyoming: 356 N. Wolcott St., Casper. Louisiana: Bonner Civ (P. O. Box 430). Texas: Midland (Telephone 1992). Corpus Christi (Telephone 22703). Ft. Worth (Telephone 46523).

DRILL CUTTINGS ANALYSIS, cure for blind drilling

Core Lab's exclusive service of Drill Cuttings Analysis, plus *complete* Core Analysis performed at the well site, is the perfect coordination of drilling, coring, and core analysis. The oft deceiving slush pit rainbow can be ignored — because *unexpected pays are pin-pointed with infinite accuracy and measured for productive possibilities. Anticipated productive formations are nailed down to eliminate unnecessary coring operations.*

Each foot drilled is logged at the well site for drilling time, hydrocarbon concentration indicating oil and/or gas, lithology, and mud characteristics, versus depth for total interval logged. When a probable productive zone is found and cored, each foot of analyzable core recovered is measured for that formation's physical characteristics and contents.

Consider carefully the advantages of being able to *see* every foot drilled, coring only those comparatively few analyzable feet out of the total depth, and having those few feet accurately analyzed for effective pay, fluid contacts, and estimated potential and maximum recovery.

Core Lab is increasing its fleet of Drill Cuttings Analysis units as fast as possible. The Core Lab man nearest you is available for a discussion of this service.

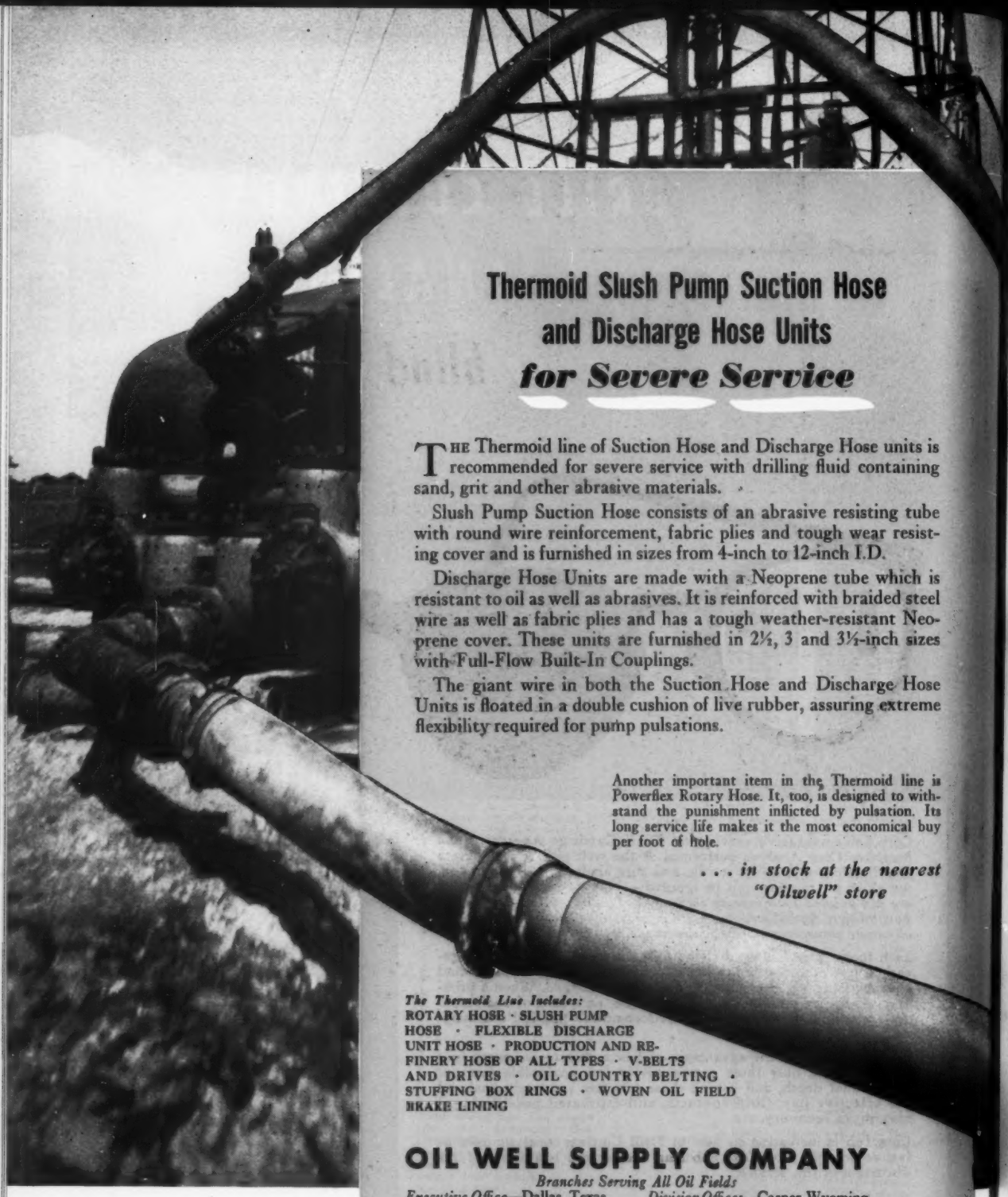
CORE LABORATORIES, INC. • DALLAS, TEXAS

HOUSTON CORPUS CHRISTI SHREVEPORT TYLER LAFAYETTE NATCHEZ
OKLAHOMA CITY DENVER MIDLAND ABILENE RANGELY BAKERSFIELD

"If it's worth coring, it's worth analyzing."

CORE LAB

PETROLEUM RESERVOIR ENGINEERING



Thermoid Slush Pump Suction Hose and Discharge Hose Units *for Severe Service*

THE Thermoid line of Suction Hose and Discharge Hose units is recommended for severe service with drilling fluid containing sand, grit and other abrasive materials.

Slush Pump Suction Hose consists of an abrasive resisting tube with round wire reinforcement, fabric plies and tough wear resisting cover and is furnished in sizes from 4-inch to 12-inch I.D.

Discharge Hose Units are made with a Neoprene tube which is resistant to oil as well as abrasives. It is reinforced with braided steel wire as well as fabric plies and has a tough weather-resistant Neoprene cover. These units are furnished in 2½, 3 and 3½-inch sizes with Full-Flow Built-In Couplings.

The giant wire in both the Suction Hose and Discharge Hose Units is floated in a double cushion of live rubber, assuring extreme flexibility required for pump pulsations.

Another important item in the Thermoid line is Powerflex Rotary Hose. It, too, is designed to withstand the punishment inflicted by pulsation. Its long service life makes it the most economical buy per foot of hole.

. . . in stock at the nearest "Oilwell" store

The Thermoid Line Includes:
ROTARY HOSE · SLUSH PUMP HOSE · FLEXIBLE DISCHARGE UNIT HOSE · PRODUCTION AND REFINERY HOSE OF ALL TYPES · V-BELTS AND DRIVES · OIL COUNTRY BELTING · STUFFING BOX RINGS · WOVEN OIL FIELD BRAKE LINING

OIL WELL SUPPLY COMPANY

Branches Serving All Oil Fields

Executive Office—Dallas, Texas
Export Division Office—
30 Rockefeller Plaza
New York 20, N. Y.

Division Offices—Casper, Wyoming
Columbus, Ohio . . . Dallas, Texas
Houston, Texas . . . Tulsa, Oklahoma
Los Angeles, California

UNITED STATES STEEL

OIL WELL SUPPLY COMPANY · USS · OILWELL · UNITED STATES STEEL

"OILWELL"

... THIS COULD HAPPEN TO YOU!

BLAST RIPS SIGNAL HILL OIL TANK

Explosion Laid to Fumes Above Tank

A terrific oil tank explosion in the Signal Hill oil field early today caused damage estimated at $50,000 and threatened the lives of firemen who battled the flames which followed.

One tank containing 5000 gallons of oil was destroyed, a second was damaged and a nearby derrick was wrecked in the blast.

It was believed an accumulation of fumes above the crude oil level was responsible for fire in the first tank.

Risking their lives, a group of firemen entered the second tank, also containing 5000 gallons of oil, and extinguished the flames with foam and water. There were no injuries.

The tank exploded with a roar that could be heard for miles around. Flames shot 150 feet into the air.

Three ignited wood derricks were saved from destruction.

A high voltage line was destroyed.

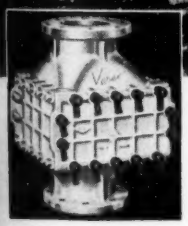
Two police officers saw the tank explode as they were giving a traffic citation nearby. They turned in an alarm that enabled firemen to reach the scene before the blaze had spread too much.

The Signal Hill fire department was assisted by three companies of the Long Beach fire department.

Flames into th...

P2

Photo by L.A. Daily News



"VAREC"
Approved

Flame Arrester Figure No. 50 Series. Listed by Underwriters' Laboratories, approved by Associated Factory Mutuals' Laboratories and other Safety authorities.

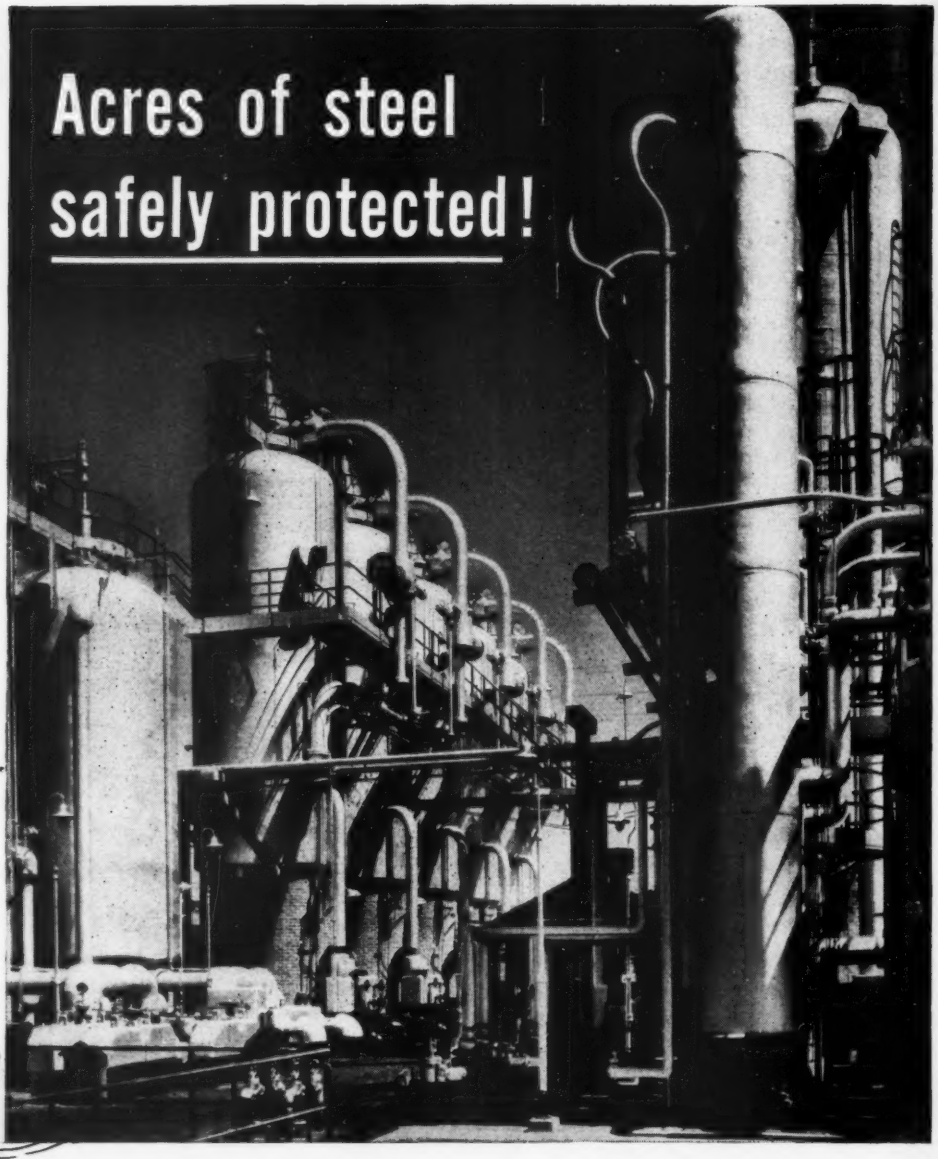
It might not have happened if the tanks were adequately protected with flame arresters and other safety devices. "VAREC" Approved Equipment gives you that protection. "VAREC" Approved Flame Arresters flow large volumes of gas, yet when fire occurs, they immediately stop any flames from passing back into the tank. "VAREC" Approved Internal Safety Valves and Check Valves when exposed to external fire act to quickly stop liquid flow into and from the tank. Investigate these and other "VAREC" Safety Devices for your storage tanks. Write for the "VAREC" P-7 Catalog today.

"Varec" THE VAPOR RECOVERY SYSTEMS COMPANY
COMPTON, CALIFORNIA, U.S.A.

NEW YORK	CLEVELAND	CHICAGO	TULSA	HOUSTON
30 Church Street	1501 Euclid Ave.	122 So. Michigan Ave.	533 Mayo Building	821A M. & M. Bldg.

Cable: VAREC COMPTON (all codes)

Acres of steel safely protected!



with DU PONT DULUX Metal Protective Paints

Rusting of exposed metal is an always-present maintenance headache for oil refiners. Structures and equipment require a *rugged* finish to protect the investment against this insidious disintegration. That's why so many maintenance men use DULUX for long-term protection.

These men make their selection on *facts*. They know the DULUX Metal Protective Painting System directly controls corrosion in two important ways. First, the resulting film is highly impermeable to moisture. Thus, an effective barrier is provided. Secondly, the DULUX Primers discourage rusting *chemically*. This two-way approach to the problem is their assurance of long-term protection.

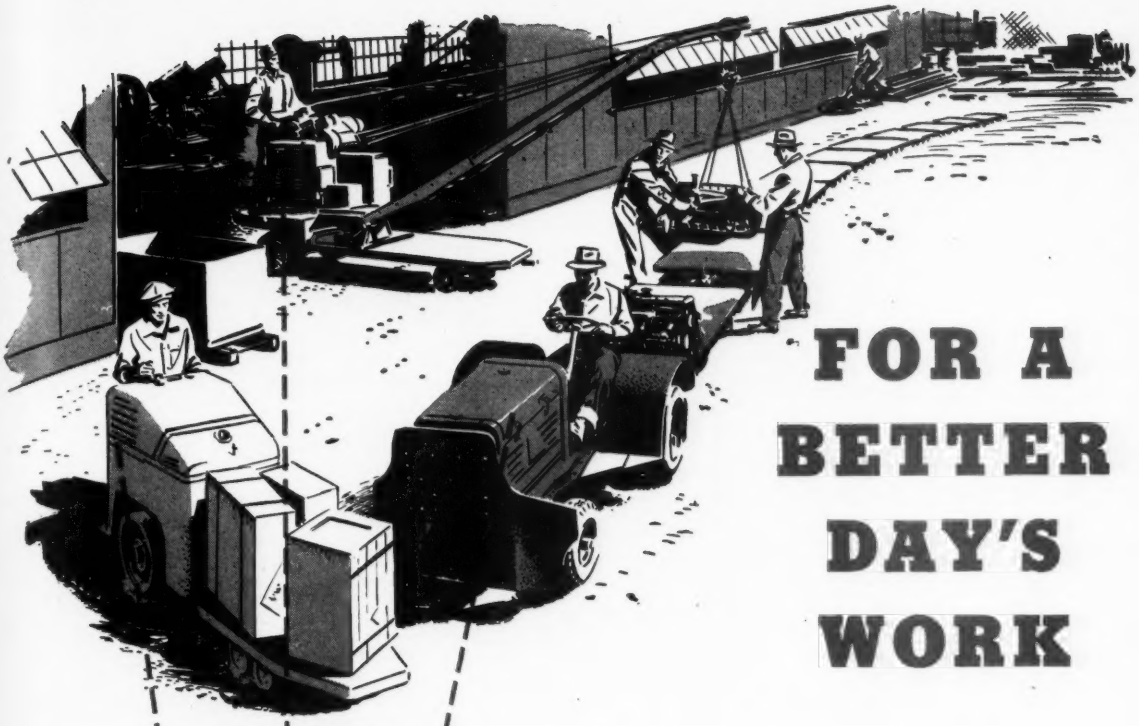
Your selection of the quality paint . . . DULUX . . . is the best insurance you can buy. When you consider the large capital investment represented by your processing equipment . . . when you consider the extra dividends of the added life-span of the DULUX film, your cost-per-gallon is infinitesimal!

For technical advice on your maintenance painting problem, write to E. I. du Pont de Nemours & Co. (Inc.), Finishes Division, Wilmington 98, Delaware.

DU PONT
REG. U. S. PAT. OFF.

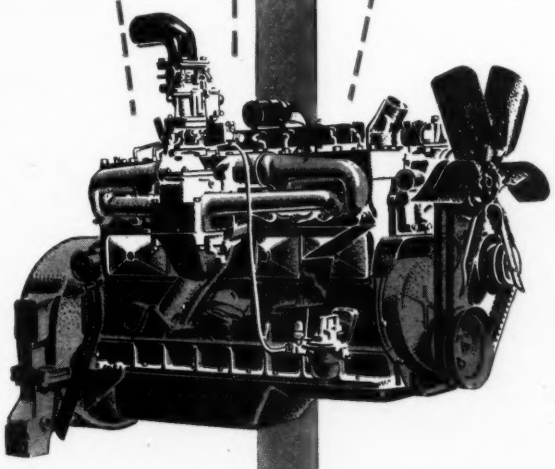
BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

DULUX
REG. U. S. PAT. OFF.
Metal Protective
PAINTS



FOR A BETTER DAY'S WORK

IN INDUSTRY—ON FARMS—IN OIL FIELDS—IN FORESTS AND ON THE HIGHWAYS!



● The job of keeping America's production lines rolling calls for power that knows no quitting time . . . power that serves *every* shift efficiently and economically. That's why you'll find Chrysler Industrial Engines and Power Units serving American industry in cranes, lift trucks, tow trucks, pumps, air compressors and arc welders. The manufacturers of industrial equipment know that each Chrysler Industrial Engine is the result of the engineering and production skill of Chrysler Corporation. They know from experience that Chrysler Industrial Engines are built to deliver A Better Day's Work!

NATION-WIDE SERVICE

FACTORY-ENGINEERED AND TESTED PARTS WITH EXPERT MAINTENANCE WHEREVER YOU ARE

CHRYSLER

INDUSTRIAL ENGINES

HORSEPOWER WITH A PEDIGREE

INDUSTRIAL ENGINE DIVISION, CHRYSLER CORP., 12200 E. JEFFERSON, DETROIT 31, MICH.

A REAL BUY
IN VENTING CAPACITY

S&J

The astute buyer of petroleum tank venting equipment is primarily interested in three factors: SAFETY, CAPACITY, and PRICE. No other pressure regulator on the market gives the buyer so much for his money as the S. & J. Fig. ST-2500 Regulator shown above.

Design features compound the Tank Working Pressure for use in breaking ice, coke, or gummy substances which might form on seats or parts. The design also provides for the safety of the tank under other unusual conditions.

The S. & J. Regulator consists of two units—a Main Valve and a pilot valve. One pilot valve may serve to operate a number of Main Vent Valves. Dollar for dollar, this arrangement provides more venting CAPACITY than any other arrangement offered to date. Write for complete details and prices.

SHAND & JURS CO. BERKELEY, CALIFORNIA • New York · Chicago · Houston · Los Angeles · Seattle

SHAND & JURS

"Tubing?...Yes, I know where we can get it

YOU ARE INVITED

to see the modern Nikoh plant in operation when you come to Chicago for the annual meeting of the American Petroleum Institute. Free bus service will be provided to and from the plant.... plan now to be our guest and see how tubing and pipe are formed with automatic machinery. It's a date!

"In *our* business we can't afford to get caught short. Constant market changes, unstable conditions, and our large volume requirements compel us to keep tab on a lot of suppliers—both actual and potential.

"So when the Chief asked about tubing, I was able to pop right back, 'Sure, I know where we can get it.' I knew that we could send steel to Nikoh and get quick service on the big quantities of tubing we need."

NIKOH for welded steel tubing, pipe, conduit

NIKOH TUBE COMPANY • 5001 South Kedzie Ave., Chicago 32, Ill.

NIKOH

1. Electrical Industry
2. Process Industries
3. Furniture & Fixtures
4. Toys & wheel goods
5. Heating, ventilating, air conditioning
6. Machinery, metalworking
7. Railroad, marine
8. Refrigeration
9. Petroleum
10. Automotive, aviation

Nikoh has plant capacity available for fabricating welded steel tubing (½″ to 4″ OD), pipe (¾″ to 6″ ID), and conduit (½″ to 2″). Formed and welded with efficient new equipment that assures uniform quality, accuracy to specifications, prompt shipments, and moderate price. Consult Nikoh on your problems of engineering and production.

NIKOH TUBE COMPANY 5001 S. KEDZIE AVE., CHICAGO 32, ILL

NATASCO

SPECIALIZED Protection for Steel Tanks AGAINST CORROSION

FROM SOUR CRUDES
ELECTROLYSIS
SALT WATER

NATASCO CORROSION PROTECTION FOR TANKS IS MORE EFFECTIVE

NATASCO specializes in the protection of tankage against corrosion damage because tank corrosion is a complex problem for which there is no "cure-all." Natasco corrosion engineers appraise every job, study the type of corrosive damage, select the best coatings for maximum protection, and specify the preparation and application procedure. There is a Natasco coating specifically designed for each tank area and the type of corrosion encountered there. Natasco supervisors are expert at preparing the tank surfaces before the coatings are applied. Natasco *engineers* every tank coating job, because years of experience have proven that KNOW-HOW is one of the most important factors in effective protection.

BECAUSE NATASCO Engineers

- ***Appraise the requirements on every job.***
- ***Make sure that the tank surface is correctly prepared.***
- ***Designate specific coatings for maximum protection.***
- ***Supervise the application by Natasco-trained crews, using Natasco-designed equipment.***

BECAUSE NATASCO Coatings are

- ***Insoluble in petroleum and petroleum vapors.***
- ***Chemically inert in dilute solutions of H_2SO_4 and HCl.***
- ***Chemically inert to hydrogen sulfide.***
- ***Of high dielectric strength.***
- ***Elastic, withstanding stresses of tank movement without rupture.***
- ***Strongly adherent to steel, wood or concrete.***

FOR COMPLETE INFORMATION, WRITE OR CALL THE NATASCO COMPANY

GENERAL OFFICES:
THE NATASCO COMPANY
POST OFFICE BOX 1318, TULSA, OKLAHOMA

CALIFORNIA REPRESENTATIVE:
COAST CONTRACTORS, LTD.
4636 E. SLAUSON, MAYWOOD, CALIFORNIA

NR-48-1

"Keeps new tanks new...Makes old ones do"

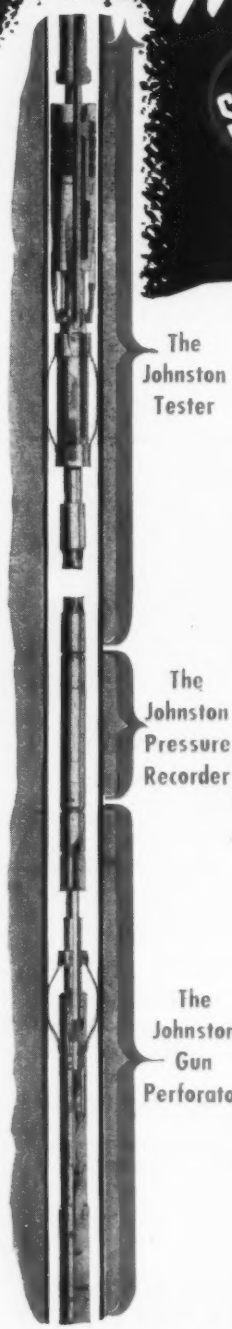
Here's the Combination

that enables you to PERFORATE and TEST IN A SINGLE RUN

SHOOT-N-TEST

Trademark

JOHNSTON — FORMATION AND CASING TESTING



The Johnston "SHOOT-N-TEST" Gun Perforator connected to a regular JOHNSTON PRESSURE RECORDER and FORMATION TESTER permits both casing perforating and formation test in a single trip of tubing or drill string.

The JOHNSTON *FORMATION TESTER*

The JOHNSTON FORMATION TESTER is relied upon by operators throughout the world for determining the productivity possibilities of sands encountered in drilling wells as they are penetrated without the expense of setting casing. Its wide range of applications makes it adaptable to every formation testing job on the lease.

The "SHOOT-N-TEST" *GUN PERFORATOR*

The JOHNSTON "SHOOT-N-TEST" GUN PERFORATOR has the versatility to be used solely as a casing perforator or as the perforating unit in combined perforation and test operations. Its design embodies many advanced features to make it the ideal choice for operators desiring utmost safety and efficiency in perforation equipment.

● By unitizing a Johnston "SHOOT-N-TEST" Gun Perforator with a regular Johnston Formation Tester Assembly, any designated formation can be both perforated and tested in one round trip of tubing or drill pipe. The "SHOOT-N-TEST" Gun Perforator is easily connected to Johnston test equipment for combined Perforation and Test operations. Simple top-hole manipulation of the string by the driller readies the Gun Perforator for firing—existing hydrostatic pressure in well trips the firing mechanism.

M. O. JOHNSTON OIL FIELD SERVICE CORP.

3035 Andrita St., Los Angeles 41, California

"Servicing California-Permian Basin-Rocky Mountain Areas"

BRANCHES: BAKERSFIELD, CALIFORNIA • AVENAL, CALIFORNIA • SACRAMENTO, CALIFORNIA • VENTURA, CALIFORNIA • SANTA MARIA, CALIFORNIA ODESSA, TEXAS • CASPER, WYOMING • HOBBS, N. M.

JOHNSTON OIL FIELD SERVICE CORP.

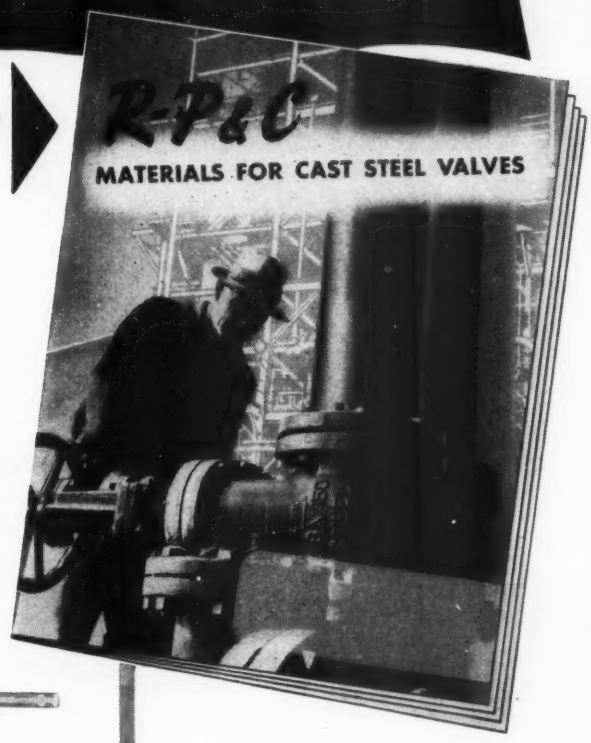
5702 Navigation Boulevard, Houston, Texas

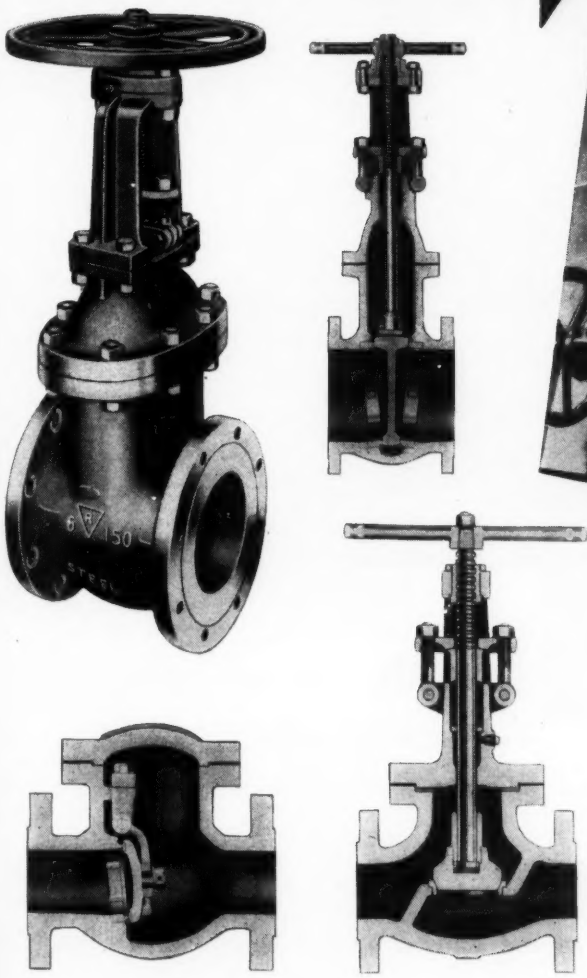
"Servicing Mid-Continent and Gulf Coast Areas"

BRANCHES: ALICE, TEXAS • VICTORIA, TEXAS WICHITA FALLS, TEXAS • GRAHAM, TEXAS, • TYLER, TEXAS • FERRIDAY, LOUISIANA • LAKE CHARLES, LOUISIANA • SHREVEPORT, LOUISIANA • LAUREL, MISSISSIPPI • MAGNOLIA, ARK. • CHICHASHA, OKLA.

Get Better Service from
CAST STEEL VALVES

This Booklet will tell you How





• A lot of things affect the life and well-being of a valve. One of the first is the materials that go into it.

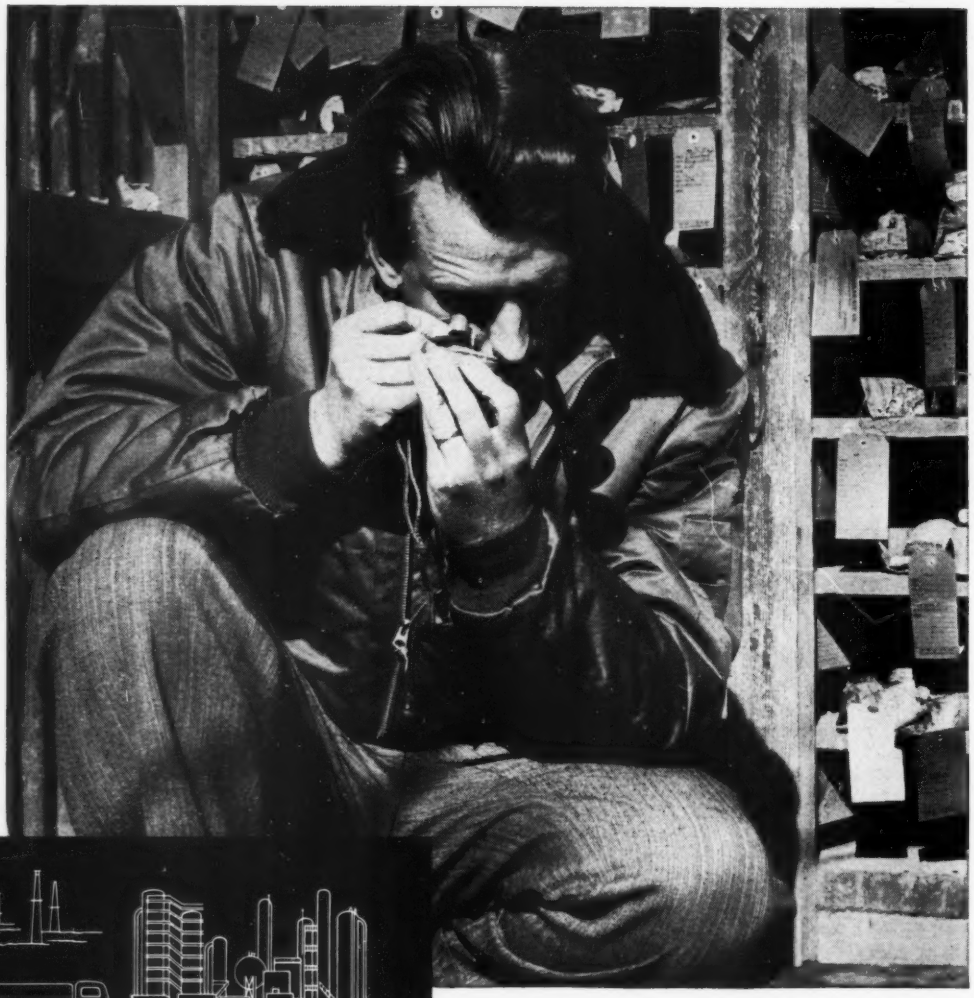
To help you get the best service possible from cast steel valves, we have prepared this booklet of tabulated information about steel valve materials.

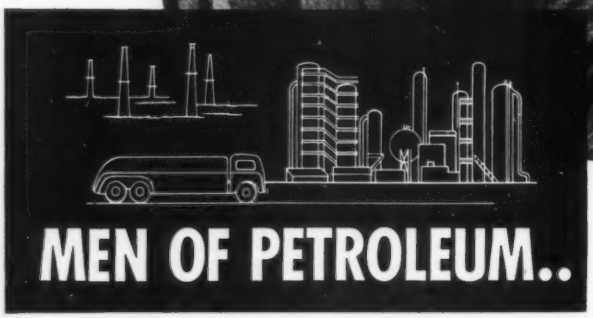
Write us for your copy. Just ask for DH-1346.

ACCO Reading, Pa. • Atlanta • Baltimore • Boston • Chicago • Denver • Detroit • Houston
New York • Philadelphia • Pittsburgh • San Francisco • Bridgeport, Conn.

READING-PRATT & CADY DIVISION
AMERICAN CHAIN & CABLE

READING-PRATT & CADY



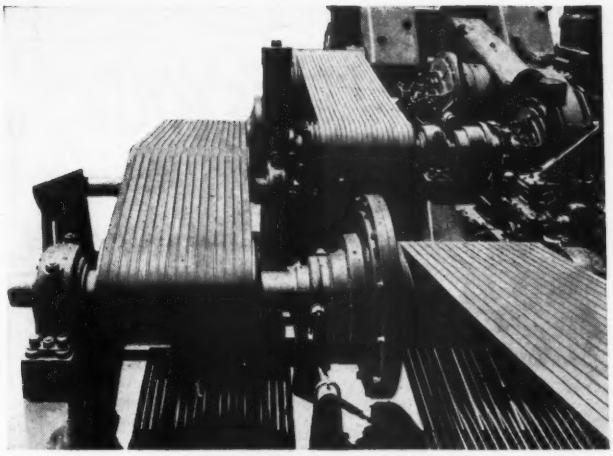


MEN OF PETROLEUM..

GEOLOGIST... our front-line scout—our sharp-eyed explorer of the earth's crust. With sensitive instruments and a seasoned "rock-sense," he probes deep into underground structures. This geologist is checking core samples; looking for formations that may indicate oil. Then it's up to the drillers to prove whether he's right or wrong. Thus our geologists touch off the long chain of events—from drilling to marketing—that end up with the countless petroleum products serving America.

STANDARD OIL COMPANY OF CALIFORNIA

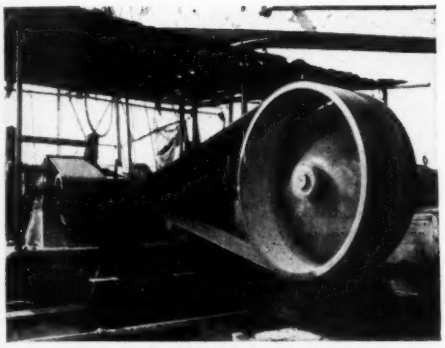
GILMER HAS THE PULL



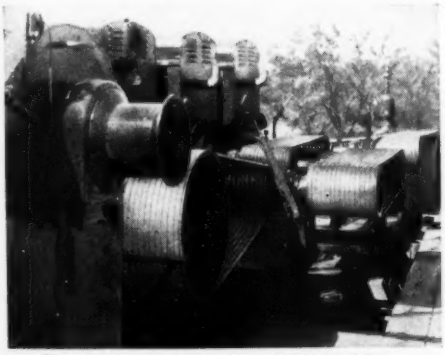
Gilmer V-Belts on mechanical rotary rig.

Gilmer BELTS

put extra power in your heavy-duty drives with GILMER MULTIPLE V-BELTS



Gilmer V-Belts on drilling rig in oil field service.



Gilmer V-Belts on compound drives, oil field installation.

Gilmer Multiple V-Belts are built for power and performance. They have gripping power, pulling power and lasting power. And their use in oil field service assures maximum belt economy.

Because of their straight wall construction, sides tend to push outward as belts flex around sheaves. They hug grooves with a non-slip grip, yet release freely as belt straightens out.

Each belt bears its full share of the load, for they are precision molded to close tolerances, and stretch is controlled by the strong, conditioned pulling cords. Tough, wear-resistant jackets are made extra heavy for rugged service.

Gilmer makes a complete line of belts for oil field service, including cut edge belts and the double-duty Kable Kord—two belts in one, contactor and power.

GILMER ENGINEERS will be glad to help you with any of your power belt problems.

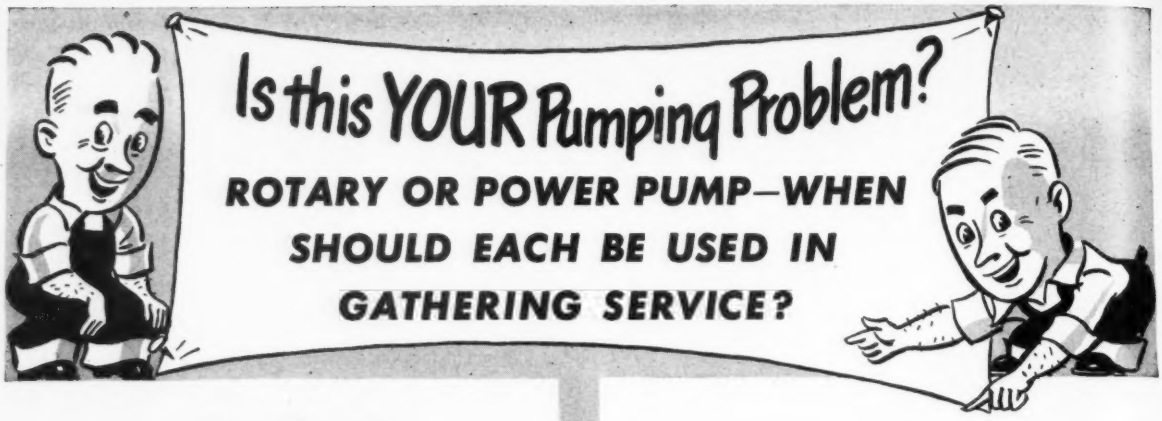
WRITE FOR FREE COPY of the Gilmer Guide . . . contains much engineering data that will help you get more from your V-Belt drives.

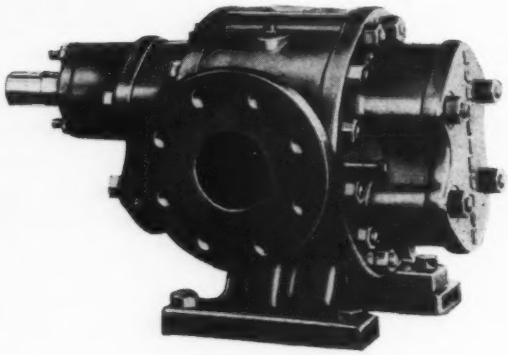
L. H. GILMER COMPANY • Tacony, Philadelphia 35, Pa.

Division of United States Rubber Company

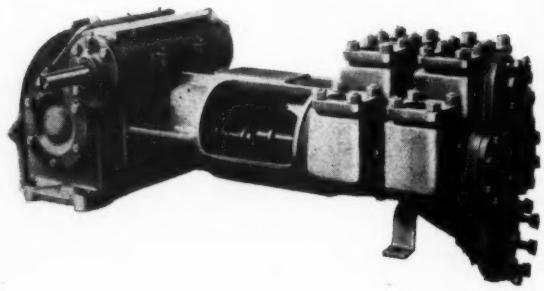
BUY THROUGH YOUR GILMER DISTRIBUTOR

V-Belts • Flat Belts • Hose • Packing • Wire • Tape





A Worthington Rotary Pump



A Worthington Power Pump

WHETHER to use a rotary or a power pump on gathering lines depends largely on capacity losses which, in turn, are affected by operating pressures. Capacity losses are minimized by: (1) close clearances between casing and pumping elements; and (2) by packing against wear to maintain these clearances.

Rotary pumps depend on close clearances alone, since packing against wear is usually impossible. Therefore, they are best for pressures of 500 psi or less, where capacity losses are negligible. Other rotary advantages for low pressure gathering duty are: light weight, portability, excellent suction qualities, self-priming ability under difficult conditions, and low original and replacement costs.

Power pumps, being packed against wear to maintain close clearances, are fortified for high pressure loads. And, since they are stationary, comparatively heavy, with easily replaceable parts, they give best results in high pressure gathering.

Pumps for Every Need

Worthington's long experience in custom-building to the oil and gas industries' special requirements assures you exactly the right type and size of pump for every job. For fact-full literature proving *there's more worth in Worthington*, drop a line, stating your pumping problems, to *Worthington Pump and Machinery Corporation, Reciprocating Pump Division, Harrison, New Jersey.*

WORTHINGTON

PH.3

THE WORLD'S BROADEST LINE ASSURES YOU THE RIGHT PUMP FOR EVERY JOB

Published every Thursday by The Petroleum Publishing Co., 211 S. Cheyenne, Tulsa, Okla.

P. C. LAUINGER
President

S. H. ROURKE
Business Manager

HANSON B. PIGMAN
Circulation Manager

ADVERTISING
MITCHELL TUCKER
Manager

Houston Office
Sterling Building, Phone Charter 4-4626
WAYNE RIVES
Vice President, Gulf Coast Sales

New York Office
415 Lexington Ave., Phone Murray Hill 2-4731
CHARLES A. WARDLEY
Eastern Manager
EDWARD C. PAGE
Representative

Chicago Office
105 West Madison, Phone Central 6-2537
C. R. FARMER
Manager
E. S. KLAPPENBACH
Representative

Pittsburgh Office
429 Fourth Ave., Phone Atlantic 4835
ALFRED M. JONES
Representative

Tulsa Office
211 S. Cheyenne, Phone 3-6291
JOHN D. REILLY
Representative
J. PARKER HOLLAND
Production Manager

Los Angeles Office
650 S. Grand Ave., Phone Vandike 0722
DONALD O. HANSON
Manager

England Office
32, The Avenue, Beckenham, Kent
A. J. CHAMBERS
Representative

Member
Audit Bureau of Circulations
Associated Business Papers

JOURNALLY Speaking

Shmoo Oil

IF you keep up with Li'l Abner in the funny papers you know all about shmoos, those mythical, marvelous beasties that supply the citizenry of Dogpatch with all the necessities of life—po'k chops, milk, aigs, fried chicken, and suspender buttons.

But what have shmoos got that oil hasn't got? Oil gives plastics, fertilizer, glycerine, rubber tires, cigaret lights, cleaning compounds that do milady's dishes and clothes in nothing flat, and scores of other necessities of the American way of life, plus powering our farms, factories, and family flivvers. Without oil we'd all have to work as hard for a living as Dogpatch did before shmoos.

Only reason the American public is not as rapturous over petroleum as Dogpatch is over shmoos is that the petroliferous blessings have been put into use gradually and are hidden behind a maze of such terms as hydrogenation, detergents, synthetic elastomers, and catalytic polymerization. Maybe petrochemistry would get more public acclaim if it changed its name to something simple like shmoo.

Pay Zone

SLIPPED slyly into our Drilling Contractors' issue (October 7) was a rainbow-like wall chart overprinted with geologic terms and carrying the streamer: "Journal-Log of Formations and Pay Zones."

One of us who doesn't know as much about such things as he ought to asked blandly "It's pretty, but what is it?" His ears were promptly batted down by our staff geologists and drilling engineers who had spent weeks preparing this little dilly.

With injured pride they explained that this correlation of the local terminology for regional geologic strata (or is it stratums?) is a ready reference long needed by everyone who looks for, or produces, petroleum. While not actually claiming that their multicolored brainchild will tell exactly where to strike oil, they contended that it is a real pay zone and one of those things the well-informed wildcatter can't do without.

Of course, they said with a deep larding of sarcasm, the dumb cluck who thinks oil just comes out of those filling-station pumps won't have any use for it, but every real oil executive will keep it under the glass top of his desk and the men in the field will wear out a copy every week.

Further questioning, however, brought out the admission that no self-respecting geologist will agree with any other as to just which local term corresponds with one somewhere else, and that our handsome Journal-Log may engender not a few arguments.

So our mail may be heavy with squawks, but we don't mind. We claim this is something that needed to be done and we did it.

Martial Memo

COMES a notice of the third annual "Bureaucrats' Buffet," being a reunion of oil-men "alumni" of PAW, WPB, ODT, and other wartime agencies. It will be held in connection with the A.P.I. convention in Chicago, November 9, and it wouldn't be surprising to see a lot of oil executives crashing the party to keep on chummy terms with these men just in case, what with the unpleasant tone of the foreign news dispatches these days.

Atomic Reading

SUBSCRIPTION order came in the other day from U. S. Atomic Energy Commission, Oak Ridge, Tenn., and at the risk of being accused of prying into atomic secrets we couldn't help speculating on whether they are working on plans to substitute atomic energy for gasoline (as the comic-book heroes have done for years) or perhaps adapting the fission principle to oil cracking. Maybe after a hard day slaving over a hot plutonium pile they like to relax by reading something simple such as hydrogenation of oleofinic hydrocarbons.

Working in the dark?

You don't have to play blind man's buff when you're looking for added production.

Dowell Service Engineers are ACIDIZING EXPERTS

You get the best when you call in Dowell for acidizing service.

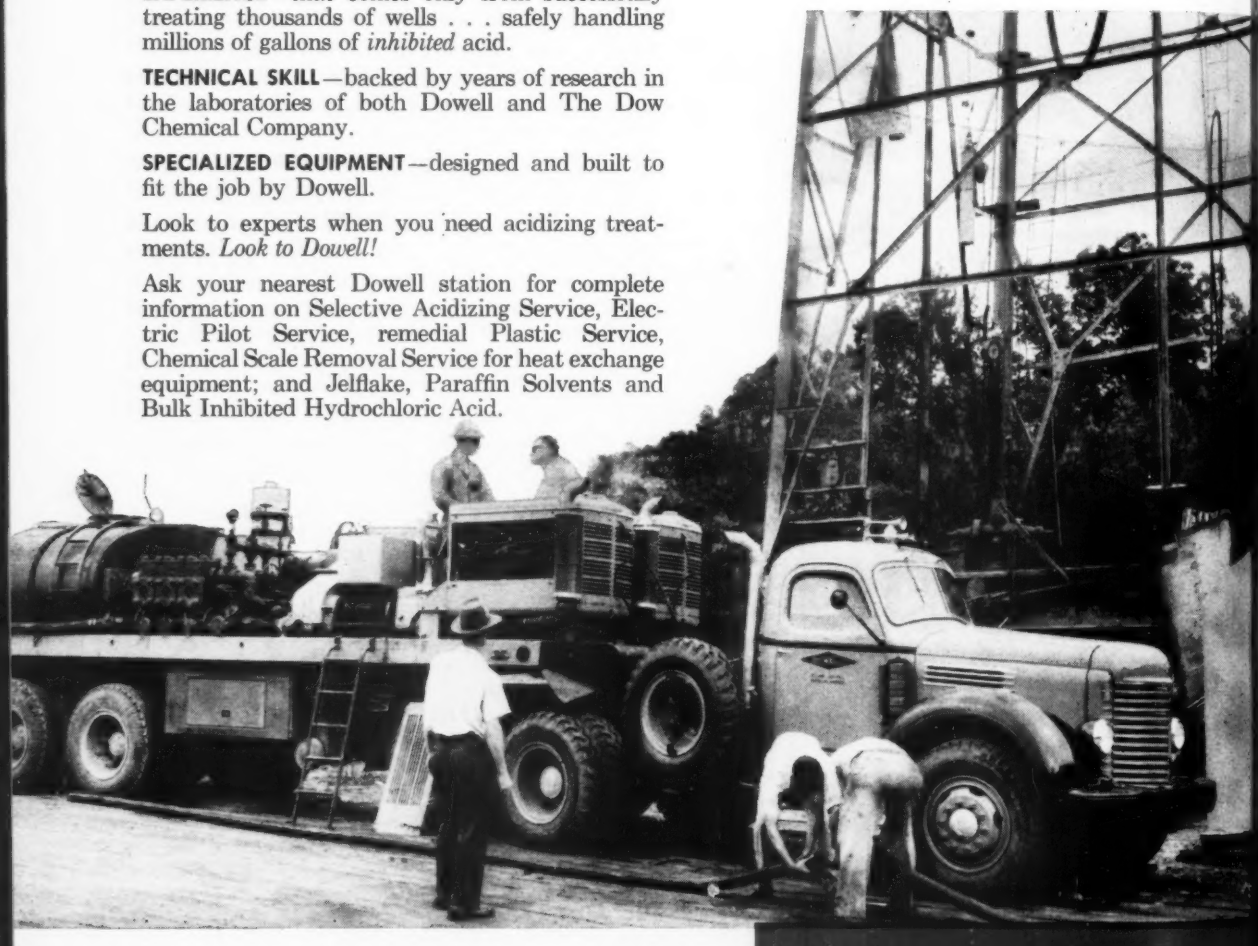
EXPERIENCE—that comes only from successfully treating thousands of wells . . . safely handling millions of gallons of *inhibited* acid.

TECHNICAL SKILL—backed by years of research in the laboratories of both Dowell and The Dow Chemical Company.

SPECIALIZED EQUIPMENT—designed and built to fit the job by Dowell.

Look to experts when you need acidizing treatments. *Look to Dowell!*

Ask your nearest Dowell station for complete information on Selective Acidizing Service, Electric Pilot Service, remedial Plastic Service, Chemical Scale Removal Service for heat exchange equipment; and Jelflake, Paraffin Solvents and Bulk Inhibited Hydrochloric Acid.



PRODUCTION INCREASED AFTER 10 YEARS!

A Permian Grayburg well completed in 1937 was squeezed with 75 sacks of cement to shut off water. Production remained at one b.o.p.d. and ½ b.w.p.d. for 10 years despite acidizing in 1940. At the suggestion of a Dowell engineer, the well was gun perforated in the open hole from 2550 to 2610 and then acidized with 2000 gallons of Dowell X. Production increased to 50 b.o.p.d.

DOWELL INCORPORATED, TULSA 3, OKLAHOMA

Subsidiary of The Dow Chemical Company

"Petroleum Promotes Progress"

DOWELL

FOR OIL INDUSTRY CHEMICAL SERVICE

the OIL AND GAS JOURNAL

FOUNDED IN 1910 BY PATRICK C. BOYLE

VOL. 47, NO. 26 OCTOBER 28, 1948

EDITORIAL STAFF

C. O. WILLSON
Editor

Kenneth B. Barnes ..... Engineering Editor
Henry D. Ralph ..... News Editor
George H. Weber ..... Refining Editor
415 Lexington Avenue, New York City
Paul Reed ..... Pipe Line Editor
W. L. Nelson ..... Technical Editor
Lynn M. Nichols ..... Associate Editor
Neil Williams ..... Associate Editor
Charles J. Deegan ..... Associate Editor
R. B. Tuttle ..... Associate Editor
C. Dudley Johnston ..... Staff Artist

DISTRICT EDITORS

Warren W. Burns 415 Lexington, New York City
John C. Casper ..... 211 S. Cheyenne, Tulsa
J. W. Clote ..... 211 S. Cheyenne, Tulsa
Herndon David .. 650 S. Grand Ave., Los Angeles
Dahl M. Duff ..... Sterling Bldg., Houston
Carl F. Hoot ..... Mercantile Bank Bldg., Dallas
Victor Lauriston 35 Stanley Ave., Chatham, Ont.
Bertram F. Linz ... 621 Albee Bldg., Washington
Leigh S. McCaslin ..... Sterling Bldg., Houston
Dan B. Miller ..... 211 S. Cheyenne, Tulsa
D. H. Stormont .. Mercantile Bank Bldg., Dallas

EDITORIAL ASSISTANTS

Polly DeArmond ..... 211 S. Cheyenne, Tulsa
Essie Mae Abbott ..... Sterling Bldg., Houston

CORRESPONDENTS AT

Denver, Colo. Calgary, Alta.
Pittsburgh, Pa. Ashland, Ky.
Columbus, Ohio Oil City, Pa.

Subscription rate to the petroleum industry, United States and foreign, 1 year, $3.00. Single copies, 20 cents. Back copies when over a year old, 50 cents. Note: Payments from outside the U.S.A. may be in the form of an international money order or check on a U.S.A. bank. Entered as second-class mail matter at Tulsa, Okla., under Act of March 3, 1879. Copyright 1948 by The Petroleum Publishing Co.

In This Issue

News

Oil Industry Has Met Supply Challenge by Voluntary Allocation . 54
Two Men Resign from Louisiana Oil Board . 55
Kettering Receives A.P.I. Award As Petroleum Industry Tribute . 55
Crude-Price Boost Line Wavers, Southern Minerals Cuts Postings 56
Speakers at I.N.G.A.A. Criticize Industry and Government Acts . 58
Louisiana-Arkansas Oil Men Told of Conservation Practices . 59
Jersey, Socony Seek Decision on Red Line Bar to Aramco Deal . 60
U. K. Has Refinery Expansion Program . 61
New Discoveries Extend Two Fields in Venezuela . 61
New Shell Company Takes Over Western Hemisphere Activities . 62
Gas Development in Italy Depends on Internal Cooperation . 62
Navy Plans to Drill Three More Test Wells in Alaska Next Year . 63
Acetylene from Methane Forecast to Texas Chemical Engineers . 64
Col. Vogel to Head Petroleum Division of Resources Board . 66
Commerce Department Out of Voluntary Steel Allocation Fuss . 69
Socony-Vacuum Executives Discuss 1949 Activities . 74

Engineering - Operating

Prevention of Corrosion in Sour Wells With Organic Inhibitors . 76
Texas Natural Gas . 81
Catalytic Treatment of Synthetic Gasoline . 86
U. of Texas Well-Sample Library Offers Increased Facilities . 95
Questions on Technology . 99
Locating and Repairing Leaks in "Biggest Inch" Gas Line . 103
Digests of Penn State Secondary-Recovery Meeting . 105
Remote-Control Power Tongs Take Sweat Out of Round Trip . 108
Engineering Fundamentals—Internal-Gas-Drive Reservoir . 115
Cost-imating—Exchangers . 117

Exploration - Drilling

How Will End of Shortage Affect Exploration? . 137
Highlights of Week's Developments . 137
Reports by Areas Start on Page . 139
September Completions Hit New High for Year . 151
Weekly Well-Completion Record . 152
Daily Average Production for Week . 153

Departments

Journally Speaking . 49
Editorial . 53
This Week . 57
International News . 60
Watching Washington . 65
Personals . 72
Deaths in the Industry . 75
Refining News . 119
Pipe-Line News . 123
Natural-Gas News . 128
Drilling Contractors . 131
Running High . 132
Statistics and Trends . 152
Market Summary . 154
Equipment Men in News . 156
Classified Advertising . 157
Calendar of Events . 162
Advertisers' Index . 162

ARE THESE THE QUESTIONS you would ask about any packer?

CAN IT BE DRILLED UP EASILY?—The Baker Retainer Production Packer is completely drillable. You will never have to "mill up" a Baker Packer.

DOES IT RESIST CORROSION?—Yes, the cast iron construction of the Baker Packer is far more resistant to corrosion than the steel casing in which it is set.

IS THE PACKER INSTALLED AS PART OF THE TUBING STRING?—Not the Baker Retainer Production Packer which virtually becomes a part of the casing when it is set. The tubing can be pulled and run-in again as often as is necessary.

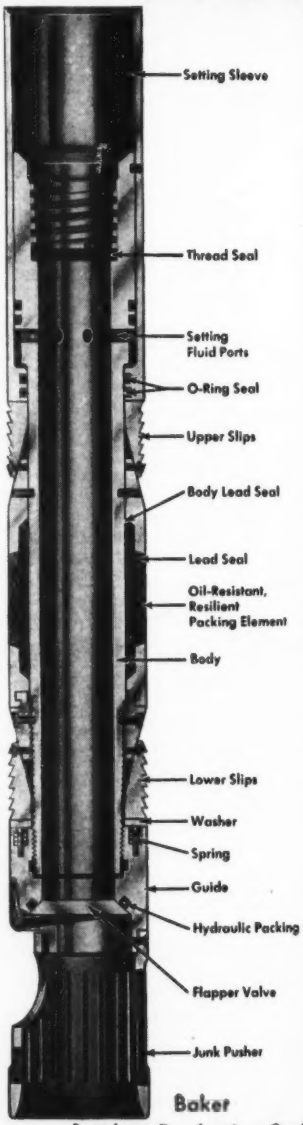
DOES IT HOLD BOTH WAYS?—Yes; Baker Packers are anchored against either upward or downward movement by two full sets of opposing slips.

DOES IT REQUIRE "SET-DOWN" WEIGHT?—When it is desirable, the tubing can be suspended in tension, thus eliminating the possibility of "corkscrewed" tubing which would hinder or prevent dropping pressure bombs, or other similar operations.

DO YOU HAVE TO REMOVE THE PACKER TO GUN-PERFORATE OR CLEAN OUT BELOW IT?—Not the Baker Retainer Production Packer, which is equipped with a positive-sealing, flapper type back-pressure valve. This flapper valve opens readily to permit the downward passage of tubing or tools, but closes instantly to hold safely against back-pressure when the tubing (or tools) are being removed from the well.

IS IT ADAPTABLE TO SEVERAL APPLICATIONS?—Yes; to practically all applications, and to all operating procedures. Single-zone or two-zone hook-ups are possible to meet any production requirement. The Baker Retainer Production Packer also is ideal for water-injection or flooding re-pressuring, re-cycling, testing, acidizing, gas-lift, and many other applications.

WHO MAKES THIS PACKER, AND HOW CAN I GET MORE INFORMATION ABOUT IT?—The Baker Retainer Production Packer (Product No. 415-D) is made by Baker Oil Tools, Inc., and Baker representatives are stationed in all active areas to give you prompt and intelligent service. Get in touch with your nearest Baker man today.



Baker
Retainer Production Packer
Product No. 415-D

BAKER
OIL TOOLS, INC.
Houston • Los Angeles • New York

BAKER
RETAINER PRODUCTION
PACKER

THE OIL AND GAS JOURNAL

Marginal Operations

CONDITIONS over which operators have had no control brought a variety of marginal activities in the oil business starting in late 1941, some of which are in effect today.

During the early war period the disruption of coastwise tanker movements by enemy action necessitated an overnight expansion in rail and truck shipments. Truck movements of several hundred miles and costly rail deliveries over a large part of this country became common.

Later, in the rush to supply high-octane gasolines, blending materials were shipped long distances and then often the finished product was transported by rail to another part of the country. The normal movements of crude oil and products in some cases were reversed in all types of transportation. The war ceiling on prices was a factor in what was done.

It was thought that all these and other extraordinary practices would end with V-J Day, but many of them didn't. Operators soon found themselves faced with increases in demand, and with facilities which had been expanded to their limits during the war. Transportation was inadequate and expensive rail hauls with operators paying the bills continue to this day.

To supply the needed products, regardless of costs, obsolete refining and other manufacturing equipment was brought back into service. Some cracking operations have been shut down and the equipment used in the atmospheric distillation of crude oil. With the markets dominated by the demand for products used as fuel the usual balance in plant operations has been sacrificed to secure these products. This has brought reduced yields of the most valuable products, an operating situation which can only be justified when there are threatened shortages and comparatively high prices prevail from all the fractions secured from a barrel of crude oil.

In the fields there has been expansion in some instances without the customary regard for the maximum efficient rate of production nor the time to work out methods of recovery based on today's techniques.

Just what these marginal operations represent in relation to the total is anybody's guess. The point stressed here is that the need for them, except in isolated cases, has ended.

Supplies have eased to the point where it would be better for the individual operator to buy from other sources of supply rather than continue a production, transportation, or refining operation which represents little or no profit and no longer is required to supply demands.

Until these former emergency and uneconomic activities have been shut down they will serve to confuse the current statistical situation in domestic and international markets and will postpone the determination of what adjustments in operations, either up or down, are needed to keep supplies in balance with seasonal requirements.

N.P.C. Delays Policy Report, Studies Storage, Praised for Meeting Demands

by Bertram F. Linz

WASHINGTON. — District committees working under the oil industry's voluntary allocation agreement have the supply situation "well in hand" and even on the West Coast, where the refinery strike cut deeply into stocks, there will be no difficulties this winter, barring a long spell of extreme weather, a cutting off of overseas supplies, increased military demand, or interruption of operations by strikes or disasters, the National Petroleum Council was told October 21 at its final meeting of the year.

The reports of the district committee chairmen were backed up by an acknowledgment by Adm. E. D. Foster, chairman of the Armed Services Petroleum Purchasing Agency, that the industry had met the challenge laid down at the July meeting, when application of the mandatory-order provisions of the Selective Service Act was threatened if military needs were not immediately filled. A report prepared by Howard W. Page, acting chairman of the military and government petroleum requirements committee, also supported the industry's position by stating that armed services needs during the first half of 1949 will call for approximately the same volume from United States sources as during the current half year.

Steel Industry Criticized

An anticipated report on national oil policy failed to materialize, due to inability of the committee to agree upon a number of points, but it was indicated that no important issues were in controversy and that most of the differences concerned verbiage and minor points and have been turned over to subcommittees for reconciliation. The committee, headed by A. Jacobsen, president of Amerada Petroleum Corp., New York, will meet again in Chicago November 8, and will submit its report for formal action at the January meeting of the council.

A report by the steel requirements committee headed by Russell B. Brown, general counsel of the Independent Petroleum Association of America, pointed out that the steel industry has accepted voluntary allocation agreements covering less than 10 per cent of the oil industry's requirements and has steadfastly refused to consider any allocation for tubular goods despite the efforts of Interior Department officials. The matter was extensively discussed and Max W. Ball, director of the Oil and Gas Division, who assured the council the department would continue to seek a reconsideration of the decision of the steel products advisory committee and will try to secure for the oil industry an opportunity to state its case directly to the steel industry.

Tankage for primary storage of crude, nation-wide, totals 416,727,000 bbl., and for clean products 319,759,000 bbl., it was reported by L. S. Wescoat, president of Pure Oil Co., Chicago, chairman of the committee on petroleum storage capacity. Actual inventories at the end of last March were 177,480,000 bbl. of crude and about 150,000,000 bbl. of clean products, but 65 per cent of the former and about half of the latter represented "unavailable" stocks necessary for operations.

High Inventories Needed

The report pointed out that more than 30,579,000 bbl. of crude are required to fill tank farm and main trunk pipe lines, 5,165,000 bbl. to fill tankers, barges, tank cars, and trucks, and about 100,000,000 bbl. to assure continuous operation of pipe lines and refineries and the handling and blending of the various grades of crude oil. In clean products, about 11,500,000 bbl. are required to fill pipe lines, tanker, and other transportation, and 6,500,000 bbl. are necessary as pipe-line operating reserves.

The committee made no estimate of the amount of additional storage facilities necessary for conduct of the industry on its present and expected high levels and bring tankage into the same relation with demand as in 1921.

"One of the most interesting findings of this study is the very large petroleum storage capacity required in the United States to maintain normal flexibility of operations, over and above that actually occupied by current inventories," Wescoat said. "On March 31, 1948, there was an average of 100 bbl. of storage capacity for every 41 bbl. of petroleum inventories. To those outside the petroleum industry this relationship may appear unusually large but to the petroleum industry this simply confirms operating experience indicating a relatively high capacity is needed compared to inventories in order to operate efficiently. This does not mean, of course, that there was room to store an additional 59 bbl. for every 41 bbl. then on hand and still continue to operate the industry normally.

"In no sense is the difference between these inventory and capacity figures an indication of usable storage space."

Other committees having projects in hand submitted only progress reports on government royalty oil regulations, petroleum refining capacity, and national petroleum emergency. W. W. Vandeveer, president of Allied Oil Co., Cleveland, was named chairman of the committee on petroleum industry manpower, which will hold its first meeting in Chicago during the American Petroleum Institute convention.

Page's report on military requirements showed that commitments for the current half year now amount to 46,009,000 bbl. against requirements of 47,998,000 bbl. Of this, 30,462,000 bbl. was committed from United States sources against commitments of 30,451,000 bbl. In individual products, the only substantial shortage of commitments against requirements is in kerosine.

Military Demands Met

For the first half of next year, Page reported, current estimates call for provision from domestic sources of 42,215,000 bbl. and 15,263,000 bbl. offshore. Aviation gasoline requirements, he pointed out, are less than for the current period, due to the completion of stock building, but include estimated requirements for a continuation of the Berlin air lift.

In a discussion of the pipe-line situation, John E. Boice, transportation specialist of the OGD, reported that 8,547 miles of line have been completed since the end of the war, 1,132 miles are under construction, and 6,579 miles are planned, eventually providing an addition of 16,258 miles to total major facilities. At the close of 1947 there were 119,298 miles of interstate pipe lines, but including intrastate lines not under the jurisdiction of the Interstate Commerce Com-

mission the total is estimated at 160,000 miles.

The NPC approved a budget of $60,000 for the coming year, an increase of $10,000 over the 1948 figure required because of the heavy load of work which the voluntary agreement has imposed upon the council.

In appreciation of the service rendered by the council. Interior Secretary J. A. Krug presented an engraved certificate to each of the members who have served during the 2½ years the NPC has been operating.

Max W. Ball announced that this would be the last council meeting he would attend as a government official and fixed the date for his retirement as head of the OGD as December 1. He expressed appreciation of the help the NPC has given his office, the department, and the government generally, and in turn heard from many members of the council expression of appreciation of his own services.

ECA Explained

In a review of the oil operations of the Economic Cooperation Administration, Walter J. Levy, chief of its petroleum branch, declared that the increase already made in Europe's refining capacity has enabled it to absorb additional quantities of crude, so that its increased consumption of products was effected without placing any additional load on the overtaxed refining capacity of the rest of the world. Also, he said, the improved tanker position has enabled one of the important foreign producers to market fuel oil which formerly had to be pumped back into the reservoir. All these factors, together with a sizable increase in European coal production, have combined recently to ease the fuel-oil position in Europe and may permit and even necessitate a moderate increase in the use of fuel oil in industries in some countries, he told the council.

Currently, Levy said, the ECA plan to switch intra-European trade from the dollar to other currencies raises problems in establishing a clear line of demarcation between dollar and nondollar oil, and the ECA equipment-financing program poses further difficult questions involving the balance of the future product output with potential European consumption.

"The whole structure of European oil imports will undergo changes and a greater interchange of products between European countries will be necessary," he explained. "Even at best, imbalance may remain."

Also, he added, if European companies expand production and refining as part of the world-wide growth of the industry, there are bound to be repercussions on our own imports and exports, but it is equally evident that Europe cannot achieve recovery without increasing its total production and exports to a point where it can balance its budgets and its foreign payments.

"Recovery in Europe will necessarily affect the world's oil economy, including that of the United States," he warned.

No definite date was set for the next meeting of the council, but it will be held during the week of January 17, when the Malone committee plans to open its investigation of the oil situation.

Two Men Resign From Louisiana Oil Board

HOUSTON.—B. A. Hardey, Shreveport, and W. Scott Heywood, Jennings, La., have resigned from the Louisiana State Mineral Board as a result of recent legislation giving control of the board to appointees of the administration of Gov. Earl K. Long.

Control of the board passed to Long appointees after the legislature approved an amendment to the act creating the board which increased its membership to 10 persons. The board is in charge of leasing state lands, including those in the Gulf of Mexico where an active drilling campaign is taking place.

In a letter of resignation to the governor, Heywood said: "It is apparent that the amendment increasing the board to 10 members was done for the purpose of having 6 new members control the policies of the board, and since 4 of the new members have met with the original board and have participated in two meetings and have apparently decided that they do not need any more advice. . . . I am certain my services are not needed any longer."

He pointed out that the new members at the October 8 meeting replaced James W. Smither, New Orleans, as vice chairman, and B. A. Hardey, Shreveport, as chairman. Heywood said Hardey had "done an outstanding job for the benefit of our state and has spent his own time and funds defending our tidelands at Washington without remuneration."

At the meeting referred to the board elected O. G. Collins, Shreveport, chairman and R. B. Prentice, Houma, vice chairman. Claude Bonnecarrere was reelected secretary.

Kettering Receives A.P.I. Award As Petroleum Industry Tribute

DR. CHARLES FRANKLIN KETTERING, internationally known scientist, inventor, and manufacturer, recently retired vice president of General Motors Corp. and general manager of its research laboratories division, will be awarded the American Petroleum Institute's "Gold Medal of Distinguished Achievement," at the A.P.I. annual meeting in Chicago, November 8-11.

C. F. KETTERING

The distinguished scientist was chosen as the 1948 Gold Medal winner in recognition of his long career as a scientist, inventor, engineer, manufacturer, humanitarian, and philosopher, and for his many invaluable contributions to mankind.

Among a multitude of other inventions, he contributed to the automotive ignition system, self starter, lighting systems for automobiles, and lighting systems which brought electricity to farm homes isolated from central power systems. In addition he is a cosponsor with Alfred P. Sloan, Jr., of the Sloan-Kettering Institute for Cancer Research.

Long known as one of the nation's outstanding public speakers, Dr. Kettering will address the meeting following the formal presentation of the award.

The A.P.I. Gold Medal was presented to Henry Ford, founder of Ford Motor Co., in 1946 for vision, courage and independence; and to Dr. William Burton, Cambridge, Mass., former president of Standard Oil Co. (Indiana), in 1947 for having developed the first commercially successful cracking process to extract more gasoline from crude oil.

Government Lease Rules on Oil-Shale Lands Modified

WASHINGTON.—Regulations of the Bureau of Land Management with respect to permits, leases, and licenses, have been modified to permit the Secretary of the Interior, in order to encourage activity on the public lands, to waive, suspend, or reduce the rental or minimum royalty on any leasehold or area segregated for royalty purposes for the production of shale oil, when it is demonstrated that the leases cannot be successfully operated under the original terms.

The modification was included in a number of technical changes made in the regulations to encourage the production of phosphate, sulfur, and shale oil from the public lands.

Crude Price Boost Line Wavers as Southern Minerals Cuts Postings

THE campaign to raise the price of crude oil lost ground last week when Southern Minerals Corp. of Corpus Christi reduced its postings by 35 cents per barrel effective 7 a.m. October 23 and returned to its old schedule of prices.

In other areas, however, producers continued to put pressure on large purchasers, and there were reports that many crude-oil connections are being shifted and that some purchasers are paying unannounced premiums which are tantamount to higher postings.

Southern Minerals, which produces and buys about 38,000 bbl. daily, was the first company to meet the 35-cent increase in price announced by Phillips Petroleum Co. September 28.

"We have supported the higher postings for 3 weeks," said Maston Nixon, executive vice president of Southern Minerals. "This is a reasonable time to determine the willingness of purchasers to accept the higher price for crude oil. In fairness to our refiner customers that depend on us for crude supply, we feel that this action is necessary in order to restore them to a competitive position with other units in the industry."

Phillips to Stand Pat

Earlier, Nixon made it plain that there is no corporate or contractual relationship between Southern Minerals and Phillips other than the fact that Southern Minerals sells Phillips about 2,500 bbl. daily for use at the refinery of Phillips' subsidiary at Sweeny, Tex. Phillips receives less than 10 per cent of Southern Minerals' crude, Nixon said.

This action drew from K. S. Adams, president of Phillips, a reiteration of his previous statements that his company has "no intention of backtracking" from its stand in maintaining its higher postings. He added that nothing has happened to change the picture since his statement of a week previously in which he said:

"Increased costs in finding, drilling, and producing additional crude oil reserves are the basic reasons for Phillips' action in posting the higher price. An increased price at this time will help the country to develop its own domestic reserves for military and civilian use rather than to become dependent upon imported oil."

A similar position was taken by J. H. Dunn, president of Shamrock Oil & Gas Co., Amarillo, which also met the 35-cent increase immediately after it was announced by Phillips. Declaring that Shamrock had no plans for back up on this action, Dunn said: "I am still hopeful that the industry as a whole will meet this advance as the increase was fully justified in order to meet production needs and in the discovery of new oil resources."

E. Wasser of Derby Oil Co., which also met the increase, said: "We would be rather slow about backing down on our high posting. We have been teriffically short of crude."

Another company paying the higher price is Barnsdall Oil Co. which buys about 19,000 bbl. daily and sells an estimated 12,000 bbl. per day to Phillips and officials of this concern were quoted as saying it probably would follow Phillips' decision on prices.

Unconfirmed reports were circulating this week to the effect that one or two large purchasers are offering contracts of 1 to 2 years' duration based on a premium 35 cents above the present posted price. Some of these contracts were said to include a provision that the premium would continue to be paid in addition to any future increase in the posted price.

These reports indicated that a good many connections are being shifted and that the companies offering premiums are arranging to take considerable volumes of crude away from buyers still adhering to the old posted price, but none of these reports was substantiated by the principles alleged to be involved.

If true, this development would be a return to the conditions prevailing a year or so ago when the practice of paying premiums for crude connections was quite prevalent and producers frequently shifted from one buyer to another. This eventually led to a general increase in postings, which virtually did away with premiums.

No Pinch on Crude

At that time, however, there was a general shortage of crude and almost every refining company had difficulty obtaining a sufficent supply to maintain its refinery runs at the required level. This pinch now is off as the supply of crude is about in balance with demand, a factor which has been cited by officials of a number of major companies, and others, as operating against a general increase in prices. As a matter of fact, the spot market for some petroleum products has weakened considerably, and in a number of areas refiners have had to slash prices on residual fuel oil in order to move it out of storage needed for other products.

On the other hand some observers are wondering how long individual refining companies can stand to lose crude to competitors paying premiums, assuming that connections are being lost in regions where other crude cannot be obtained to keep up refinery and pipe-line runs.

Some major companies were known to be preparing to pay royalty on oil run from University of Texas lands on the basis of the higher Phillips price. Lease terms provide for the highest posted price in the area which is considered the entire Permian basin and not the individual field. Bascom Giles, commissioner of the general land office in Austin, said several companies had notified him they would pay the extra amount, "regardless of their own posted price." Giles said run tickets will be checked later, and any producer not paying on the basis of the highest price will be billed for the increase.

Texas Seeks Bids on Upland And Submerged River Tracts

AUSTIN.—Bids for mineral leases on about 125,000 acres of upland and submerged lands will be received December 7 by the Texas State School Land Board.

Surveyed tracts in 14 inland counties will be offered along with submerged river-bed tracts in seven coastal counties. None of the submerged tracts to be offered are in the Gulf of Mexico, according to Bascom Giles, commissioner of the General Land Office.

Federal Court Fish Case Watched by Texas Oil Men

HOUSTON. — Louisiana fishermen have attacked Texas ownership of lands beyond the 3-mile limit in the Gulf of Mexico in a federal court case of interest to the oil industry.

The fishermen are asking that recent Texas statutes setting up registration and license fees for nonresident fishermen and commercial fishing boats be held unconstitutional. A hearing in the case is to be held in Austin, November 1, by Federal District Judge Ben Rice, Jr.

The Louisiana plaintiffs contend that Texas does not own the fish and shrimp within its Gulf boundaries since the state does not extend beyond 3 miles into the Gulf.

Oil-industry sources here, however, minimized the importance of the suit. They pointed out that the U. S. Supreme Court last spring held in a North Carolina case that the state has police power over fishing in its offshore waters.

this week

POLICIES—NPC postpones national oil policy draft until January, though agreement reported on all but minor points. . . . ¶NPC committee reports on oil storage capacity, declares high level essential for working purposes. . . . ¶Policies of both FPC and natural-gas pipe-line companies severely criticized at I.N.G.A.A. convention. . . .

INTERNATIONAL—Socony-Vacuum and Jersey Standard plan court action to invalidate "Red Line Agreement." . . . ¶Shell Caribbean Petroleum Co. takes over other Shell members to become one of largest oil firms in Western Hemisphere. . . . ¶Opposing interests in Italy are retarding natural-gas development. . . . ¶Geological study of Alaska expands with three wells to be drilled by Navy in 1949. . . . ¶Aramco interests in Kuwait-Saudi Arabia neutral zone may be released. . . . ¶Tucupido and Pelayo fields, Venezuela, are extended by step-out producers. . . .

GOVERNMENT—Military praises industry for meeting demands, withdraws threat of mandatory orders, outlines coming oil needs. . . . ¶Col. Vogel shifts from ASPB to NSRB and will work on controversial Pratt report. . . . ¶Oil industry left to shift for itself for steel supplies. . . . ¶Louisiana State Mineral Board breaking up under charges of political interference. . . .

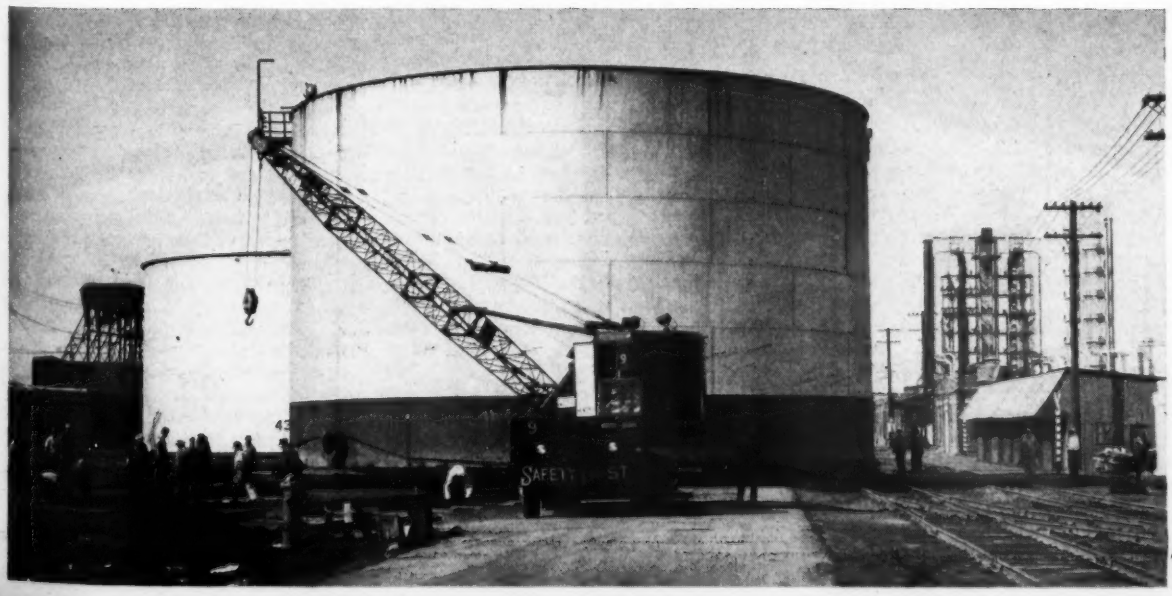
REFINING—Addition of storage facilities in northeastern United States will improve products supply situation this winter. . . . ¶Petrol Refining, Inc., will add two crude-oil topping units to its Texas City plant. . . . ¶McMurrey Refining reports new on-stream record of 178 days for its Dubbs thermal unit at Tyler, Tex. . . .

PRICES—Crude-price situation remains in delicate balance, with forces pressing both for and against general acceptance of 35-cent increase. . . . One purchaser drops the increase after 3-week trial. . . . Reports rampant of extensive premium paying tantamount to secret price increase. . . . ¶Marketers concerned over The Texas Co. action in adopting policy of quoting destination prices on refinery products. . . . Action believed to reflect Supreme Court decision in cement case. . . .

TIDELANDS—Supreme Court's special master appears to lean toward California's interpretation of oil areas where federal Government has paramount rights. . . . ¶Louisiana fishermen raise new challenge to Texas' claims to offshore oil. . . . ¶Oil companies operating in Gulf of Mexico attempting to compose differences with navigation interests. . . .

TRENDS—U. S. crude-oil production for week ended October 23 set third consecutive all-time record high making the twenty-third all-time high mark this year. . . . Daily average was 5,597,735 bbl. . . . An increase of 12,030 bbl. over previous high of preceding week. . . . ¶New state-production record for the year established by Oklahoma. . . . Daily average for week ended October 23 was 434,450 bbl. . . . ¶Stocks of four major products for week ended October 16 show total of 276,533,000 bbl. . . . A gain of 2,016,000 bbl. over previous week. . . . Kerosine stocks drop 69,000 bbl. . . . Total stocks in same period a year ago decreased 1,120,000 bbl. showing total of 222,516,000 bbl. . . . ¶Runs to stills for week ended October 16 averaged 5,562,000 bbl. daily. . . . A gain of 395,000 bbl. daily over runs a year ago. . . .

Rolling down the highway is this 92-ton, 17,000 bbl. storage tank which had to be moved to make room for expansion in the Bayway refinery of Esso Standard Oil Co. Ordinarily tanks this large are dismantled or sometimes floated, but this was boosted onto rollers and with a crane pulling and a bulldozer pushing it got a fast ride to its new location



Speakers at I.N.G.A.A. Criticize Industry and Government Actions

by Henry D. Ralph

PRODUCERS and distributors of natural gas took off their gloves and slugged hard at various practices of the large gas companies in frank discussions of their mutual problems at the annual meeting of the Independent Natural Gas Association of America in Tulsa, October 26.

The natural-gas pipe-line industry also heard itself praised for its progressiveness, pitied for its lack of steel, and commiserated for its degree of government regulation, by other speakers on the 1-day program.

Joseph Bowes, president of Oklahoma Natural Gas Co., Tulsa, and retiring president of I.N.G.A.A., opened the convention by lauding the association for its many activities during the past year, particularly those designed to improve relationships with federal agencies. Regretting that Congress did not enact the amendments to the Natural Gas Act sought by I.N.G.A.A., Bowes said:

"At least we brought our foes out into the open. We have been shown to what extremes they will go in their effort to defeat us and the kind of game they play. In future activities, therefore, we will be in a better position to know what to expect from them and how we should prepare ourselves for meeting them."

Bowes had reference to the congressional battles over the Rizley-Moore bill which proposed to revise the law in many respects affecting relationships between interstate gas transporters and their suppliers on the one hand and their distributors on the other.

JOSEPH BOWES

Voluntary Action Suggested

This subject was discussed at greater length by spokesmen for both these groups, and both speakers took the stand that the pipe-line companies could improve these relationships in many ways through voluntary actions and without the need for regulation.

Distributors' problems were described by Guy T. Henry, president of Central Indiana Gas Co., Muncie. Title of his paper was "Relationship Between Distributing Company and Transporter," but he opened by saying that the relationship is hardly worthy of mention.

Henry then proceeded to detail the practices of some of the large pipeline companies which, he said, continually cause friction with distributors, infuriate consumers, and invite government regulation and political interference.

Before the war, Henry recalled, the pipe-line companies urged distributors to promote the sale of gas and particularly to develop industrial uses on an interruptible basis in order to provide a profitable load factor during the summer season. This was accomplished, he said, and while it made profitable business for the pipe lines it also imposed on them the obligation to continue to serve these customers.

Now, said Henry, with rates reduced by the Federal Power Commission and demands for gas soaring, these transporters are seeking "loop holes" to avoid serving their old customers in order to get more lucrative business elsewhere.

First, he said, some of these pipe lines tried to take industrial users away from the distributors and serve them directly, thus evading FPC regulation. This has been stopped by state action in Indiana but is still a problem and a source of bad relations between transporter and distributor.

He also denounced the practice of seeking distant markets while older customers closer to the gas fields are curtailed, and particularly criticized summer storage of gas in the Appalachian area at the expense of industrial users on the line who are entitled to gas during this season.

The usual answer to these problems, Henry said, is temporary allocation of gas among customers, which satisfies no one, and the statement that steel is not available to provide more gas. Unless the pipe-line companies do more than they have done to improve relations with their distributors and their consumers, Henry warned, gas will become a political issue in the Middle West because the public at large is taking a substantial interest in these problems.

Speaking for the other end of the pipe line, R. C. Kay of Amarillo, Tex., discussed "Questions Posed by the Royalty Owners," and he too found plenty to criticize in the policies of many large transporters.

Rules for Improvement

Four things should be done at once to improve relations here, Kay said:

"1. Eliminate those petty land and field practices which cause so much suspicion, resentment, and distrust. Even though the royalty owner's interest may be only one-eighth, do not begrudge him that interest or try to further minimize it.

"2. Cooperate now in a nation-wide movement for a uniform standard of measurement so that a "cubic foot of gas" means the same to all from the well to the burner tip without further qualification or definition.

"3. Work for and practice ratable take between fields and between wells in the same field. Accomplish this by state regulation wherever available and elsewhere by voluntary cooperation.

"4. Devote your efforts to the attainment of a fair and equitable field price, be it a posted price or otherwise, to all in every field or area, which will fluctuate with and only with the competitive commodity value of the gas for the uses to which it is suited in the channels of free trade."

Kay strongly urged the gas industry to adopt the practice of the oil industry and post field prices for gas, applicable to that produced by the pipe-line company as well as that purchased, and permitting the posted prices to fluctuate in competition with other fuels. This, he said, would permit long-term contracts for gas supplies without the very serious problems which arise when contracts fix a firm price which cannot be renegotiated.

On the other side of the picture, James E. Pew, manager of the natural gas department of Sun Oil Co., praised the industry by saying:

"Due to the ingenuity of the natural-gas companies in cutting costs through technological advancements and in finding industrial markets for their surplus gas during periods of low domestic and commercial consumption, it has been possible for

them to supply gas to small users at lower prices over the years.

"Were this not the case, the Federal Power Commission could regulate until doomsday and never bring domestic and commercial gas prices down to the levels of today."

Pew attacked the "utility" concept of regulating gas, saying it originated because gas first was used chiefly by householders who now consume about one-eighth of the total marketed production. He declared that this form of regulation is entirely unsuited to commercial and industrial users and has no place at all in a natural resource industry which depends on risk capital.

This situation was said by Pew to be largely responsible for the present predicament where the demand for natural gas is increasing due to its depressed and frozen price while at the same time the producer's ability to provide gas and his interest in searching for new reserves languishes.

"The application of such utility regulation to the risk-taking, competitive enterprise of exploration, drilling, and production of crude oil or natural gas introduces a concept for which no precedent is known in American legislative history," Pew declared.

He criticized the Federal Power Commission on various scores, and ended with the recommendation that the federal law be overhauled to deny FPC any authority over the risk business of oil and gas production and to provide for interstate transportation of natural gas on a common carrier basis with a willing buyer at one end and a willing seller at the other.

Pipe Supply Remains Short

Little hope for larger supplies of line pipe in the near future was given by Leigh Whitelaw, managing director of the Gas Appliance Manufacturers Association, who spoke on "What's New in Steel." The only thing new, he said, is that the gas industry must be reconciled to the prospect that the tensions of the steel situation will be a normal condition for several years.

The oil and gas industries, he said, face a more critical condition for lack of steel than any other industry, considering the percentage of the population affected, due chiefly to the impossibility of expanding facilities for manufacturing pipe.

N. C. McGowen, president of United Gas Pipe Line Co., described the reserves of natural gas in this country as estimated by the American Gas Association, and said that in the next report an attempt will be made to estimate the amount of underground storage capacity available near consuming centers. The committee, he added, will also consider issuing a set of difinitions covering the terms generally used in natural-gas production in order to clear up confusion which has arisen from the different meanings sometimes ascribed to certain common terms.

A warning that the functions of management are rapidly being assumed by state and federal regulatory agencies was given the industry by Marshall Newcomb, general counsel of Lone Star Gas Co. He reveiwed significant decisions rendered during the past year by courts, FPC, and state bodies to demonstrate the extent to which government is taking over detailed operations, and expressed the view that only an abundant supply of gas will reverse this trend.

A serious situation confronting all gas pipe lines, Newcomb said, arises from a federal court decision this fall which held a line to be a common carrier because a portion of its right-of-way crosses government-owned land although the company never transported gas for others nor sold gas for resale. This decision required the line to come under the jurisdiction of FPC and to file tariffs for transportation of gas for others.

As a result of this decision, Newcomb said, "at least one well-financed concern is now in the process of purchasing large amounts of natural gas in the field which it proposes to tender to a natural-gas pipe-line company for transportation to designated customers."

The association elected J. F. Merriam of Northern Natural Gas Co., Omaha, to the board of directors, replacing B. R. Bay of the same company, and also H. E. Meade of New Orleans Public Service, Inc., replacing A. B. Patterson, same company.

Officers elected for the coming year were:

A. B. Harper, president of Arkansas Oklahoma Natural Gas Co., Fort Smith, Ark., president; J. H. Dunn, president of Shamrock Oil & Gas Co., Amarillo, Tex., first vice president; William H. Wildes, president of Republic Natural Gas Co., Dallas, Tex., second vice president; F. W. Peters, treasurer of Oklahoma Natural Gas Co., Tulsa, reelected treasurer; and John A. Ferguson, executive director of the association, also reelected.

Louisiana-Arkansas Producers Told of Progress in Conservation Practices

NEW ORLEANS.—Additional recoverable oil made possible in Arkansas through secondary-recovery projects represent a 4-year extension of the state's reserves, O. C. Bailey, chairman of the Arkansas Oil and Gas Commission, told the annual meeting of the Louisiana-Arkansas division of the Mid-Continent Oil and Gas Association here last week.

Gas and water-injection programs in a number of Arkansas fields have increased estimated recovery in those areas by approximately 120,000,000 bbl., Bailey said. This is about four times the state's present annual production.

The Arkansas official cited the pressure-maintenance operations in the Pettit lime pool of Haynesville field as affording proof that federal intervention is not necessary to prevent waste in the oil industry. The area straddles the boundary between Louisiana and Arkansas and is under the joint supervision of the regulatory agencies of the two states. Gas injection raised estimated recovery from 4,500,000 to 6,500,000 bbl., and later, water flooding increased the total to 12,000,000 bbl.

Oil operators attending the meeting also heard a talk by S. L. Digby, Louisiana conservation commissioner, in which he asked full cooperation in the enforcement of Louisiana's regulations. Most violations occur when "someone in the field representing our department willfully had his back turned." "You should discourage this," Digby said.

Importance of a good public-relations program by the oil industry was emphasized by Digby. Oil companies, he said, should impress this particularly on their land men and field representatives who deal with the landowners. Failure to maintain good public relations, the commissioner continued, could "reach a point that whenever the legislature meets pressure would be exerted to alter, and perhaps even destroy, the conservation law."

Digby's talk at the meeting was his first appearance before a statewide gathering of oil men since his appointment last spring. He declared his purpose as commissioner was to enforce a "reasonable and sane conservation program," and said he believed "the best way to get the job done is with as little restriction and action by governmental agencies as possible."

A. R. Carmody, Shreveport, was reelected president of the division, and two new vice presidents, E. G. Robinson and William Helis, Jr., both of New Orleans, were selected. Other officers, including Sam S. Caldwell, Shreveport, executive vice president, also were reelected.

Legislation by Congress quitclaiming the tidelands to the states and clarifying the authority of the Federal Power Commission was asked in resolutions voted by the organization.

International

WORLD-WIDE OIL DEVELOPMENTS

Jersey and Socony Seek Decision On Red Line Bar to Aramco Deal

AFTER a delay of more than a year and a half, during which Standard Oil Co. (N.J.) and Socony-Vacuum Oil Co., Inc., have endeavored to reach an amicable out-of-court settlement over the so-called "Red Line Agreement" differences, the case is scheduled to go before a British court early in November. The differences arose over negotiations of these two companies to become partners in Arabian American Oil Co.

Meanwhile, Jersey Standard and Socony - Vacuum will continue discussions with C. S. Gulbenkian, their 5 per cent partner in Iraq Petroleum Co., Ltd. So far, Gulbenkian has maintained that the two American companies cannot legally become Aramco partners because the Red Line agreement clause (in the I.P.C. contract) is still valid. Jersey Standard and Socony-Vacuum hold that the agreement is invalid because of the wartime enemy alien status of Cie. Francaise des Petroles, another I.P.C. partner.

Prevents Separate Action

The Red Line agreement provided that any crude-oil production arrangement entered into by any of the I.P.C. partners in lands comprising the old Turkish Empire—circumscribed on a map by a red line—should be for the joint account of all partners in Iraq Petroleum Co. *(See The Oil and Gas Journal, December 21, 1946, page 43, for the map).*

For a time, Cie Francaise joined Gulbenkian in protesting the projected Aramco partnership of Jersey Standard and Socony-Vacuum. These two latter companies are I.P.C. partners by virtue of the jointly owned Near East Development Corp., which in turn is a 23.75 per cent I.P.C. partner. The French differences were later reconciled and Cie. Francaise offered to withdraw its legal objections which were filed in a British court.

However, both Jersey Standard and Socony-Vacuum asked the French not to withdraw the legal objections, holding that if an out-of-court settlement could not be reached with Gulbenkian over the legality of their projected Aramco partnership, then a court decision would be sought. As of early this week there was every indication that the case will go to court unless a last-minute decision is reached with Gulbenkian.

Precedent Cited

Without a doubt, Gulbenkian is well acquainted with the 1943 decision of the British House of Lords (equivalent to the U. S. Supreme Court), a decision which Jersey Standard and Socony - Vacuum, on advice of British barristers, believe will swing the case in their favor. This opinion involved the legal standing of a Dutch company (not an oil company) and whether the enemy alien status of the Dutch people could be invoked as a just reason for invalidating a prewar contract between Dutch and British interests.

The decision of the House of Lords held that, as distasteful as it was to be remined that a friendly foreign power, The Netherlands, had been invaded by the Nazis and that this had resulted in regarding the Dutch as enemy aliens, that sentiment had nothing to do with the case in point, and the contract, ipso facto, was invalid.

According to well-informed British barristers, this case probably will set a precedent and it is believed that the British courts can only reach a similar decision in regard to the French. In turn, this decision would invalidate the I.P.C. contract, and leave no doubt about the legal right of Jersey Standard and Socony - Vacuum becoming, in fact, Aramco partners.

Gulbenkian's refusal to come to terms with Jersey Standard and Socony-Vacuum probably will be given the acid test in the next few weeks, according to well-informed sources, and it is always possible that the dispute may never reach court.

Briefly, Gulbenkian is seeking certain contract terms which the two American oil companies hold are unreasonable. However, in their efforts to reach an out-of-court settlement, it is known that Jersey Standard and Socony - Vacuum have made several concessions to their 5 per cent I.P.C. partner. But Gulbenkian wants still more and is particularly desirous, according to reports, that I.P.C. partners guarantee to pay him a fixed price for his share of crude oil, if he cannot get a higher price on the open market. Moreover, Gulbenkian's lawyers reportedly have indicated that a certain lump - sum payment would help settle differences between Gulbenkian and the two American oil companies. Both of these suggestions failed.

Meanwhile, in March 1947, Jersey Standard and Socony - Vacuum announced plans for a working agreement whereby they guaranteed a bank loan of $227,000,000 for the expansion of Aramco's activities in Saudi Arabia. And except for the legal technicality, which presumably will be decided shortly, the two companies are in effect partners of Aramco, with Jersey Standard holding 30 per cent and Socony-Vacuum 10 per cent.

French to Get More

Recently a report from Paris implied that under the new I.P.C. proposed contract, the French would receive a greater share of the company. In explaining this statement, well-informed sources said that if the proposed contract goes into effect, the French will, in the 1952-57 period, receive a greater share of the crude oil from I.P.C. properties than the other partners. Presumably this concession was made in order to protect Cie. Francaise in the run for European markets and because of the fact that Jersey Standard and Socony-Vacuum will be getting increasing amounts of Saudi Arabian crude oil.

A copy of the revised I.P.C. contract has been filed with the U. S. State Department where no opposition is expected.

Aramco May Relinquish Neutral Zone

WASHINGTON. — Reliable reports to Washington stated this week that Arabian American Oil Co. is preparing to relinquish its one-half interest in the Kuwait-Saudi Arabia neutral zone where American Independent Oil Co. last summer secured full oil rights to the other one-half interest. Formal announcement of the company's decision is expected to be made by King Ibn Saud.

While no company officials have talked for publication, it is understood the giving up of its interest, which in effect was an option on a concession to be arranged if the company decided to go into the area, has been under consideration for some time and was finally determined at a recent meeting.

Major basis for the decision is said to be the fact that the cost of exercising the option would be far out of line with the concession terms which Aramco enjoys in Saudi Arabia. American Independent is understood to have agreed upon a royalty of about 35 cents a barrel to the Sheikh of Kuwait, approximately half as much again as Aramco pays Ibn Saud.

At the same time, it is understood that Aramco would like to see more companies active in the Middle East for a number of reasons, one being that this would eliminate criticisms which have been voiced in congressional and other circles that the United States was in the position of having to support and protect a single company.

At least one other company is known to be interested in securing a concession in the Middle East, and Aramco's decision will pave the way for negotiations.

New Discoveries Extend Two Fields in Venezuela

CRUDE-OIL production in Venezuela's Tucupido field, jointly owned by Pancoastal Oil Co., C.A., and an Atlantic Refining Co. subsidiary, has been stepped up from 5,500 bbl. to 7,200 bbl. daily, C. U. Daniels, Pancoastal's president, announced.

Completion of two producing wells on step-out locations in the newly productive Tucupido and Pelayo fields has proved up additional areas in both concessions.

The new Tucupido well, with an initial daily flow of 400 bbl. of 39.6°-gravity crude, was drilled on a site two locations to the east of the field's easternmost producer, according to Daniels, bringing to nine the number of producing wells at Tucupido, marking the seventh successful completion since last April and increasing that field's daily pipe-line run to 7,200 bbl., contrasted with approximately 5,500 bbl. daily in mid-September.

At Pelayo, 120 miles east of Tucupido, the newest well, third producer in that field, came in, Daniels said, "with an encouraging initial flow" to augment that field's previously indicated output of more than 1,000 bbl. daily. All three wells, however, have been shut in, Daniels added, pending completion of storage tanks, now being built, and a pipe-line extension from nearby Leona, work on which has just gotten under way.

(For additional details on Tucupido and Pelayo, see The Oil and Gas Journal, October 7, page 130, and September 30, page 55).

International

WORLD-WIDE OIL DEVELOPMENTS

Bizonal Germany Imports Rise

Import statistics show that deliveries of crude oil and oil products to the British zone of Germany in the first 3 months of this year were doubled in the second quarter of 1948. Imports into the American zone have increased about a third. From April 1 to June 30, imports of petroleum products to Bizonal Germany were 390,561 tons (about 32,546 bbl. daily) as against 226,263 tons (about 18,855 bbl. daily) in the first quarter of 1948 and 247,927 tons (about 20,660 bbl. daily) for the second quarter of 1948.

Australia Limits Use Of Aviation Gasoline

Restrictions on the consumption of aviation gasoline have been imposed in Australia. Air lines will be limited to their monthly quotas as of last July. Monthly consumption must be kept down to approximately 50,000 bbl., according to the Australian premier. Aviation gasoline for international air lines will be the only exception.

PRESIDENT OF MEXICO RECEIVES GEOLOGISTS

President Miguel Aleman of Mexico gave a reception to the geologists and their wives attending the meeting and field trip held jointly by Petroleos Mexicanos and South Texas Geological Society, in his private offices in Castle of Chapultepec, October 20. The photographer found only a handful chatting with President Aleman at the reception: Douglas Weatherston, chairman, general committee for the field trip; Jorge L. Cumming, assistant chief of exploration for Pemex and honorary member (1948) South Texas Geological Society; Manuel Rodriguez Aguilar, chief of exploration, Pemex; Sen. Antonio J. Bermudez, director of Pemex, who arranged the reception; President Aleman; Marion J. Moore, president, South Texas Geological Society; Dr. Ezequiel Ordonez, grand old man of Mexican geology and honorary member (1935) South Texas Geological Society; and Guillermo P. Salas, geologist in charge of Tampico area for Pemex

New Shell Company Takes Over Western Hemisphere Activities

SHELL CARIBBEAN PETROLEUM CO. of New Jersey, the new member of the Royal Dutch-Shell group which has just obtained a loan of $250,000,000 in the United States, apparently is destined to become one of the group's active management companies in the Western Hemisphere.

Company officials explained that the purpose of this large dollar loan is not so much to expand Shell activities as it is to make dollars available for accelerating current operations as and where necessary to maintain a strong competitive position with other large oil companies having ample dollar assets. The funds will be used wherever needed in the Western Hemisphere outside of the United States, particularly in Venezuela and Colombia and possibly in Canada and Ecuador.

The new company takes over the old Caribbean Petroleum Co., which was also a New Jersey corporation, and which is one of the principal subsidiaries of the Shell group operating in Venezuela. It is also consolidating two other Venezuelan concerns which are owned 100 per cent by the Royal Dutch Petroleum Co., namely, N. V. Nederlandsche Olie Mij., a subsidiary of Bataafsche Petroleum Mij., and Petroleum Utensils Co., which holds acreage in Venezuela. It will not take over companies which are not owned 100 per cent, such as Venezuelan Oil Concession, Ltd., Colon Development Co., Ltd., or Shell Co. of Venezuela.

Gets Shell Union Stock

The Royal-Dutch parent company has transferred to the new Shell Caribbean all of its shares of stock in Shell Union Oil Corp., which is the United States holding company for Shell activities in this country. Royal Dutch held two-thirds of Shell Union stock, the balance being held by Shell Transport & Trading Co., Ltd., of London.

This series of transactions makes Shell Caribbean Petroleum Co. one of the large oil companies of the Western Hemisphere, and it has been described as "a billion-dollar concern." Earlier this year the Shell group had raised $270,000,000 in the United States.

The loan of $250,000,000, one of the largest ever negotiated in the history of corporate finance, was obtained from a group of insurance companies who will purchase 4 per cent bonds of Shell Caribbean Petroleum Co. maturing in 1968.

In London this loan was described

by George Legh-Jones, a managing director of the Dutch-Shell group, as the first example of private financing as contemplated by the European Recovery Program. He cited provisions of the ERP agreement under which assets and earnings of an American corporation owned in Europe may contribute to the European Recovery Program and said that the new financing will permit the Shell group to speed the installation of new facilities and thus contribute to its dollar earnings.

Officials of the company in New York explained that under present conditions it is necessary to have dollars (not just money in any currency) available for almost any expansion or extensive maintenance project in the Western Hemisphere, and that the new funds will be used for producing, refining, transportation, or marketing activities as well as for any other oil operation which the company may desire to undertake.

No specific large expansion program is planned immediately, it was stated, but the funds will be available should the company bring in a wildcat in some area where large dollar expenditures are necessary for development. It is probable that some of the funds will be used in Canada where Shell is participating in the active wildcatting play, and in eastern Ecuador where Shell has a promising exploratory concession.

Natural Gas Development in Italy Depends on Internal Cooperation

FOR the development of natural-gas production and transmission in Italy, an effort is being made to bring opposing interests into one company which would be dominated by no single interest, at least no government interest, according to J. D. Creveling of Chicago, former president of Panhandle Eastern Pipe Line Co., who has been actively concerned in the past 2½ years with obtaining United States Government aid for a Po Valley gas project in northern Italy.

Natural gas could be developed in the Po Valley in 2 years as a dependable supply which would be equivalent to 1,000,000 tons of coal per year, according to Creveling, who cites that prior to the war Italy was importing about 13,000,000 tons of coal annually, principally from the Ruhr and England. Italy produces practically none of its fuel.

Reserves in the Po Delta area of Italy have been determined to be more than 1 trillion cubic feet as a result of studies made by four engineers and geologists sent to Italy in the last half of 1946 by Creveling to make a detailed study as the basis recommendations to Italian interests which engaged his services. The report of this group shows that scientific exploratory work in the Po Valley would be too expensive for Italian interests to undertake without outside credit. Gas in this area is produced with water on approximately a volume for volume basis. This water has a salt content about half that of the Adriatic sea. A natural-gas project for the Po Valley is regarded as economically feasible under certain conditions.

Creveling has agreed to try to obtain $4,000,000 to $5,000,000 of American financing to carry out the gas project provided the Italian government would whole heartedly cooperate and agree to the elimination of restrictions on the export of dollars to pay for the loan and essential services.

These conditions were not complied with when the proposal was made originally, prior to the elections of the spring of 1948 which brought a stable government to Italy. An attempt is being made to have various interests concerned cooperate for the objective of getting this natural-gas project under way. Creveling says this will be of important economic benefit for processing raw material for Italian industry which has already made a rapid postwar recovery.

Socony-Vacuum Gets Crude Co-Op Imported from Iran

Socony-Vacuum Oil Co., Inc., will purchase a 115,000-bbl. cargo of Iranian crude oil bought last month by the Cooperative Refinery Association from Anglo-Iranian Oil Co., Ltd. It will be delivered to Socony-Vacuum's Paulsboro refinery.

This is the first of two cargoes which the International Cooperative Petroleum Association arranged to purchase from Anglo-Iranian.

Navy Plans to Drill Three More Test Wells in Alaska Next Year

International
WORLD-WIDE OIL DEVELOPMENTS

WITH one test to be completed this year plans are now under way to drill three exploratory tests next year in U. S. Petroleum Reserve No. 4 located in Arctic Alaska. The drilling of three tests next year was agreed upon by members of the operating committee last month at a meeting held in Fairbanks and a program to carry out this schedule will be implemented at the regular annual meeting of the committee to be held next month at Washington, D. C.

The only test drilled this year within the 35,000-sq. mile reserve is located south of the Point Barrow camp of Arctic Contractors, which has a contract with the Navy to carry on the exploration and allied operations. According to recent reports this rotary test was drilling below 3,000 ft. and it is expected that the test will be finaled before it is necessary to shut down due to weather conditions.

Information obtained in the drilling of this test is considered of special interest as it includes a 110-ft. sand and shale section in the Upper Cretaceous. In addition to several core tests, three rotary tests were completed previous to this year—two near the camp site at Umiat in the southeastern part of the reserve and one at Cape Simpson near the Arctic Ocean where the presence of large oil seepages have been known for many years.

In addition to the two rotary drilling rigs with which the first three tests were drilled, a large rotary rig for drilling up to 15,000 ft. was brought in by water transportation last summer. The reserve also now has a cable-tool rig.

Deep Test Planned

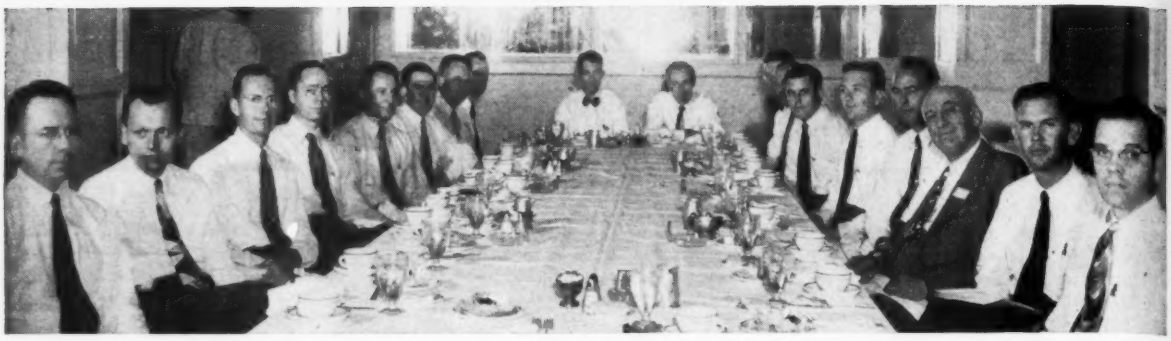
It is expected that the 15,000-ft. rig will be used next year to drill on the Oumalik No. 1 anticline. The depth to which the test will be drilled will be dependent on the structural information obtained. It has been recommended that a 2,500-ft. test with cable tools be drilled on the Maybe Creek dome. It is also planned to drill a cable-tool test in the vicinity of Umiat where the two 6,000-ft. rotary tests were completed in 1946 and 1947. The cable tools will permit a more thorough testing of shallow sands from which the only crude oil found in the reserve was obtained. It has also been recommended that four core tests of 100 to 200 ft. and an exploratory test to 2,000 ft. be drilled in the area of Simpson seeps.

It is planned to expand the geological work which is carried on under contract with the Navy by the United States Geological Survey. The 1949 program calls for maximum of four seismograph parties within the reserve during the operating season. The airborne gravity meter work which has been one of the exploratory features of the search for oil in the reserve will be resumed next year.

It is expected that plans for an exploration department to direct the future work of the reserve within the U.S.G.S. organization will be announced at the November meeting, including the appointment of an officer-in-charge. This proposal will provide for adequate trained personnel for whatever period of work that is required. This program provides for four to six geological parties per year, including airborne check parties to carry on reconnaissance mapping, detailed mapping, sampling and other field work. It will also provide for a laboratory at Fairbanks with adequate personnel and facilities, the work to be coordinated with the U.S.G.S. facilities at Washington.

(See The Oil and Gas Journal, August 9, 16, and 23, 1947, issues for detailed description of activities in U. S. Petroleum Reserve No. 4.)

Members of the operating committee of Naval Petroleum Reserve No. 4, meeting in Fairbanks. Front row: Glen Ruby, Arctic Contractors; A. A. Curtice, manager of operating committee; Comdr. G. E. Fischer, officer in charge of construction; Com. W. G. Greenman, director of Naval petroleum reserves; Herbert Hoover, Jr., Arctic Contractors; Bart Gillespie, project manager, Arctic Contractors. Second row: John Reed, U. S. Geological Survey; George Gates, U. S. G. S.; Robert Chapman, U. S. G. S.; Col. O. F. Kotick, assistant director, Naval petroleum reserves; Lt. Comdr. Fred Cooke, project manager. Third row: Stewart Folk, petroleum engineer; George Gryc, U. S. G. S.; Ted Matthews, Arctic Contractors; Ed Mundine, U. S. G. S.; Lt. Comdr. Charles A. VanDusen. Fourth row: Lt. W. J. Gregg; Walter English, technical adviser; L. W. McNaughton, member, operating committee; W. T. Reagan, U. S. G. S.; and Lt. (j.g.) D. B. Brady. Present at the meeting but not in the picture were, Howard Meyers, geophysical supervisor; R. A. Peterson, chief of research, United Geophysical Co.



Gathered in the Anchor Room of the Galvez Hotel, Galveston, Tex., are speakers and section officers at the annual technical meeting of the South Texas Section of the American Institute of Chemical Engineers held October 22. Shown are: J. L. Franklin, W. L. Bolles, L. B. Dampman, W. B. Howard, M. H. Bruner, P. B. Crawford, W. C. Cunningham, E. J. Claassen, R. A. Althouse, F. C. Bunker, H. A. Holcomb, J. D. Lindsay, A. S. Kasperik, M. E. Klecka, M. C. Hopkins, E. P. Schoch, W. W. McLean, and J. E. Kasch

Acetylene From Methane Forecast To Texas Chemical Engineers

by Leigh S. McCaslin, Jr.

GALVESTON. — License has been granted a commercial firm to manufacture acetylene from methane gas by electrical discharge, a process developed by 20 years of research at the University of Texas by E. P. Schoch and associates.

This was revealed at the third annual technical meeting of the South Texas Section of the American Institute of Chemical Engineers here October 22. As part of the program, Schoch and his coworkers presented an extensive study on the production of acetylene. The paper consisted not only of a resume of the work done at the university, but also a study of other processes and the economic feasibility of the various processes. Ultimate aim of the researchers is to produce liquid hydrocarbons by electric discharge at a cost comparable with that of the Fischer-Tropsch process. Schoch's associates include E. J. Claassen, H. A. Holcomb, W. B. Howard, A. S. Kasperik, and R. P. Lightfoot.

J. L. Franklin, of Humble Oil & Refining Co., told the 200 assembled chemical engineers of his company's program of advanced training for technical personnel at the Baytown refinery. The courses offered the engineers cover basic chemical and engineering subjects and are specifically designed to avoid vocational subjects. After 2 years of trial, during which 16 courses have been presented, the program has been described by company officials as "most successful."

To conduct the unique advanced training, Humble has secured the services of the outstanding scientists of the nation. The courses range from 1 to 4 weeks' duration and occupy the full time of the "students." Goal of the company is to have all of its technical staff attend at least one course every 3 years. In actual practice, this goal has been exceeded.

"Conjugate Liquid Phase Equilibria in C_4 Hydrocarbon-Furfural-Water Systems" was the title of a paper presented by John Griswold and R. V. O. West, University of Texas, and M. E. Klecka, Shell Oil Co. The paper is a result of the Rubber Reserve Corp. program which has been carried on under Griswold for the past several years. Initial results of experimental work on the system were described. A liquid phase equilibria apparatus of a basically new design was used for observation of conjugate liquid phases under pressure.

Heat Transfer Discussed

Paul B. Crawford, Magnolia Petroleum Co., discussed "A Proposed Mechanism for the Catalytic Cracking of Gas Oils." The proposed mechanism predicts accurately the effect of liquid hourly space velocity, process period, and temperatures on the amount of carbon formed on the catalyst.

Final paper of the program was "Radiant Heat Transmission to Non-Luminous Gases," by E. J. Claassen, University of Texas. Claassen outlined a method of calculating from existing data the calibration of heat transfer from an individual gas under various conditions.

At the banquet which ended the 1-day meeting, M. H. Bruner, E. I. du Pont de Nemours & Co., demonstrated several scores of the newest developments of modern chemical research, some of which have not yet been publicly introduced.

The committee in charge of the meeting consisted of M. C. Hopkins, Pan American Refining Corp., chairman; W. A. Cunningham, University of Texas, program; J. E. Kasch, Pan American Refining Corp., registration; and W. W. McLean, Carbide & Carbon Chemicals Corp., publicity. Officers of the South Texas Section include J. D. Lindsay, Texas A. & M. College, chairman; J. L. Franklin, Jr., Humble Oil & Refining Co., chairman-elect; and L. B. Dampman, Jr., Carbide & Carbon Chemicals Corp., secretary-treasurer.

Two New Unitization Plans Proposed in New Mexico

HOUSTON.—The proposal of Grayburg Oil Co. of New Mexico and Western Production Co., Inc., to unitize nine tracts in the Grayburg-Jackson pool, Eddy County, New Mexico, was scheduled to be heard October 28 in Santa Fe by the New Mexico Oil Conservation Commission.

The federally owned tracts are in the Grayburg Cooperative and Unit area of the field. The companies also are asking permission to drill 28 unorthodox five-spot locations upon the leases. Six other cases are scheduled for hearing by the New Mexico commission the same day. Magnolia Petroleum Co. is asking approval of proposed unit agreements for the Lindrith Unit area, Rio Arriba County, and the Cass Ranch Unit area, Eddy County.

Three Gulf Permits Asked

HOUSTON.—The California Co., New Orleans, has asked the U. S. Army Engineers office for permits authorizing drilling of three more wells in the Gulf of Mexico off the Louisiana Coast. The proposed locations are about 14 miles southwest of Grand Isle in Lafourche Parish.

WASHINGTON WATCHING

BY BERTRAM F. LINZ

Political Dope

WASHINGTON.—With the election imminent, speculation in Washington is directed to the Cabinet which Gov. Thomas E. Dewey will select if elected, and for the oil industry concern is chiefly directed, of course, to the Interior Department.

So far, no oil man appears to have been seriously considered for this post, and the chances are that the next Secretary of the Interior will be a westerner familiar with reclamation matters rather than oil, fisheries, Indians, or any other of the myriad subjects which make up this catch-all department.

In any event, it is less essential that the head of the department have an intimate knowledge of oil than to have second-string men—the undersecretary and assistant secretaries—who will not fight among themselves for position and over who is to direct what and how, and bureau heads, particularly in Mines, who are more interested in advancing the industries they deal with than in red tape. Also, it is desirable that one assistant secretary at least be familiar with present-day oil operations. And it is equally desirable that all of the men at the top be of the type that does its dreaming at night and is practical by day.

If Dewey is elected and lives up to the standard he set for himself at Albany, the department will be headed by men who believe in free enterprise, competition, and industrial progressivism, who will look at such things as synthetic fuels in their true light as developments to be aimed at and not as panaceas for current temporary conditions.

Because of the uncertainty which the oil industry has felt regarding the Government's views on control and nationalization, more than usual interest centers in the makeup of the next Cabinet.

Escape Possible

STUDY by the Tariff Commission of the proceedings of the Havana and Geneva conferences of the International Trade Organization discloses that the General Agreement on Tariffs and Trade significantly broadens the escape clause in reciprocal trade agreements made under that charter —which may be of importance to the domestic oil industry at some future time.

The escape clause originally inserted in the reciprocal agreements provided that a concession granted by the United States could be modified or revoked in the event it had resulted in imports "in such increased quantities" as to injure or threaten to injure domestic producers. Under this provision, the increase would be considered in terms of import quantities.

A different interpretation, however, was given by the signatories to the Geneva Agreement, who approved an amendment enabling the escape clause to be invoked when imports increased "relatively" to domestic production.

The one word makes a lot of difference, for it means that the threat of injury can occur if imports under a trade agreement supply a larger share of domestic consumption than they did during a previous period.

In other words, if imports, although at the same or at an even lower level than in the base period, have increased relative to declining domestic production, and injury to domestic producers has resulted, action is permissible under the escape clause, the commission held.

But at the same time, the commission said, this interpretation does not preclude action under the escape clause in cases where domestic production has expanded, if the share of imports in the domestic market has increased and the requisite finding with respect to injury is made.

Steel Bonus

STEEL manufacturers estimate that close to 2,500,000 tons of ingots have been manufactured into 1,750,000 tons of finished steel products this year by the efforts of the oil and gas and automobile industries, but to get this added pipe, sheets, and strip cost those industries about $100 a ton more than the same products were being sold for by the mills which regularly produce them.

These so-called conversion deals are not gray market transactions, but are due to the fact that steel companies often have more finishing capacity than steelmaking capacity, and if a customer can pick up ingot or semi-finished steel they are able to turn it into product for him.

It is estimated that nearly 500,000 tons of steel for pipe and other oil and gas uses was produced in this way this year.

The steel industry, apparently, is just beginning to realize that conversion deals may prove beneficial all around, producing more steel for industrial customers, more use of idle capacity, and more scrap to make more steel. The last is considered very important, since scrap continues in short supply and, so far, less than one-fourth of the German scrap destined for United States plants has been received and steelmakers are skeptical about their chances of getting all of the 435,000 tons already contracted for.

Confusion Confounded

PROBABLY nothing the Supreme Court has done in recent years has created as much furor, controversy, and uncertainty as its decision in the cement case, outlawing basing point prices, from the phrasing of which no one has been able to determine whether the absorption of freight charges by the manufacturer is illegal per se or only those pricing systems arrived at by agreement between two or more firms.

A special Senate subcommittee is investigating the situation—and probably will write legislation legalizing individually developed basing point pricing systems. Business organizations, big and little, are avowedly alarmed over the potentialities of the decision. Secretary of Commerce Charles Sawyer has publicly predicted that any extensive revision of pricing practices will have severe repercussions upon little business. And the Federal Trade Commission, which started the whole thing, is split wide open, with some members contending that nobody will be hurt but the monopolists, and other predicting that delivered prices are permanently and completely barred.

Under the decision, as many lawyers read it, basing-point prices, zone prices such as are used in the oil industry, and all other forms of pricing which contemplate that a buyer shall pay for the goods laid down at his door are banned. The large bulk-goods industries have already dropped their basing-point systems, one result being a shortage of cement in some parts of the country where local production is inadequate to meet demand.

Since a large part of our business is based on the fact that a 5-cent candy bar can be bought anywhere in the country at that price and that cement, steel, and some other products can be purchased from a manufacturer next door or one 1,000 miles away at the same price, the Supreme Court decision may well knock out all the advantages of centralized production and force the building, close

to important markets, of plants not needed because of demand but necessary to avoid high freight charges.

What the effect of the decision may be on oil prices is as yet undetermined. But it is pretty certain that producers and refiners in some spots will find the cost of cement and other materials sharply revised, the increase being in direct ratio to the distance between themselves and the nearest producer from which they can buy.

Less Industry Influence

ONE of the recommendations expected to be made in the Hoover report on the organization of the federal Government may call for elimination of the commodity divisions of the State Department and the setting up of a wall against the participation of commodity experts in the development of foreign policy.

A suggestion has been made that commodity experts be assigned to the department's regional divisions, to study and advise on industrial problems but without authority to make suggestions respecting policy.

If adopted, this would mean the elimination of the present petroleum division and reassignment of its experts among the several geographic divisions. At present, the division has a number of men, each responsible for information and studies on oil in various parts of the world, Latin America, Europe, Middle East, and its views and reports are given consideration in the determination of policies.

It has been suggested to the Hoover commission, and may be adopted by that body as its own view, that State Department should be less intimately tied to industrial objectives than sometimes has been the case in the past, and to this end the influence of commodity experts should be restricted.

The commission on the federal organization is a bipartisan body headed by former President Herbert Hoover which is making a study of the whole government establishment with a view to its reorganization in a more businesslike and effective manner. It is to submit a report to Congress next January.

Col. Gus H. Vogel to Head Petroleum Division of Security Resources Board

WASHINGTON.—Col. Gus H. Vogel, who retired August 1 as executive officer of the Armed Services Petroleum Board, will take over as head of the petroleum division of the National Security Resources Board on November 7, succeeding Capt. John Kelly, who has returned to naval duty.

It is probable that one of the first matters to come up for Vogel's consideration will be the report submitted by Wallace Pratt, formerly petroleum adviser to Chairman Arthur M. Hill, recommending among other things that domestic oil production be held to 80 per cent of MER so as to build up, at the rate of about 1,000,000 bbl. a day, an available underground reserve against the needs of a national emergency.

The report, details of which became known last month despite the fact that it was marked "Confidential," has been on Hill's desk for some weeks but has never been laid before his board formally for discussion.

It is understood that the NSRB staff now is studying the materials situation which will develop if a new lend-lease program is adopted next year to assist western Europe to rearm, which recently has been suggested. Such a program would raise new problems, particularly regarding oil and steel supplies, and in some quarters it is believed would necessitate the imposition of allocations and possibly other controls.

Sixteen prominent industrial executives, including Robert C. Dunlop, president of Sun Oil Co., were called to Washington October 22 for the first of a series of conferences designed to acquaint leading citizens with the board's planning activities.

The group comprises the newly created advisory council on mobilization of the National Industrial Conference Board, and other conferences are planned with groups representing other organizations concerned with national security. Representatives of the board, the Joint Chiefs of Staff, State Department, and Munitions Board addressed the meeting, discussing strategic planning, transportation and storage, manpower mobilization, stockpiling and conservation of strategic and critical materials, and strategic relation of production facilities.

California Meter Group Sponsors Instrument Show

LONG BEACH. — Several hundred executives, engineers, field and plant men, and technical students attended the Measurement and Control Instrument Exposition at the Long Beach Municipal Auditorium on October 22 and 23. Sponsored by the Southern California Meter Association, the exposition featured displays and demonstrations of new equipment used for the measurement and control of gases and liquids, equipment for gas utilities, gasoline plants, gas and oilfield work, and industrial plants of all kinds.

James E. Gessner of Reliance Regulator Co., general chairman of the exposition, pointed out that a representative number of manufacturers were exhibiting and stated that the exhibits were the largest and most complete of their kind on the West Coast in many years.

The Southern California Meter Association was organized in 1927 and currently has a membership of more than 400, largely in Southern California, but including all parts of the United States, Canada, and Mexico. Officers are: J. C. Groenewegen, Shell Oil Co., president; Edgar P. Valby, Richfield Oil Corp., vice president; George H. Forster, Jr., The Texas Co., secretary - treasurer; and Harry M. Kemmerer, Southern Counties Gas Co., auditor.

Midland Building Enlarged

Of interest to individuals and firms who have interests in the Permian basin area, is the announcement from Midland, Tex., of plans to expand the new McClintic Building to 14 full floors and also of the construction of 500 more homes in that city.

New Journal-Log "Drill Chart"

COMMENT on the folded multicolor insert "Journal-Log" Drill Chart which accompanied the October 7 issue has been very favorable and many subscribers have requested additional copies. This special chart, in graphic form, displays the geological equivalents of the main formations important to oil men, placed side by side for the different states and areas clear across the United States. All "oil pays" are distinctively labeled.

Compiled by the Journal staff with the assistance of consulting and company geologists, a chart of this scope and construction never before has been widely available to the industry. While they last, extra copies at 50 cents each may be obtained from Reader Service Department, The Oil and Gas Journal, Box 1260, Tulsa.

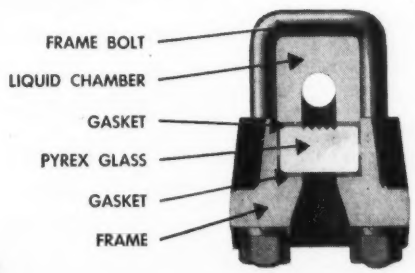
There can be NO MISTAKE in reading LIQUID LEVEL...

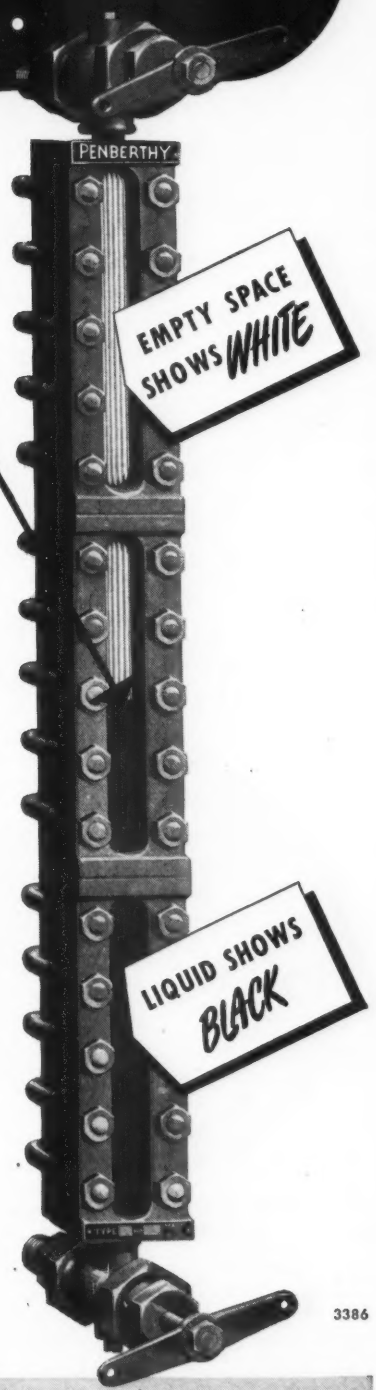
when you use

PENBERTHY Reflex GAGES

The refraction of light (an unvarying law of nature) makes the reading of Penberthy Reflex Gages unmistakable. Due to this refraction principle, the empty space always shows white—the space occupied by liquid always shows black. The dividing line between liquid and empty space is sharp and unmistakable, there can be no error in reading. It is easily read as far as you can distinguish between black and white.

Penberthy Drop Forged Steel Reflex Gages are available in whatever lengths required and for various liquids. They are also fabricated to customer's specifications from special alloys to meet unusual corrosive and temperature conditions. There is a Penberthy Gage of superior quality for every liquid level gage requirement.

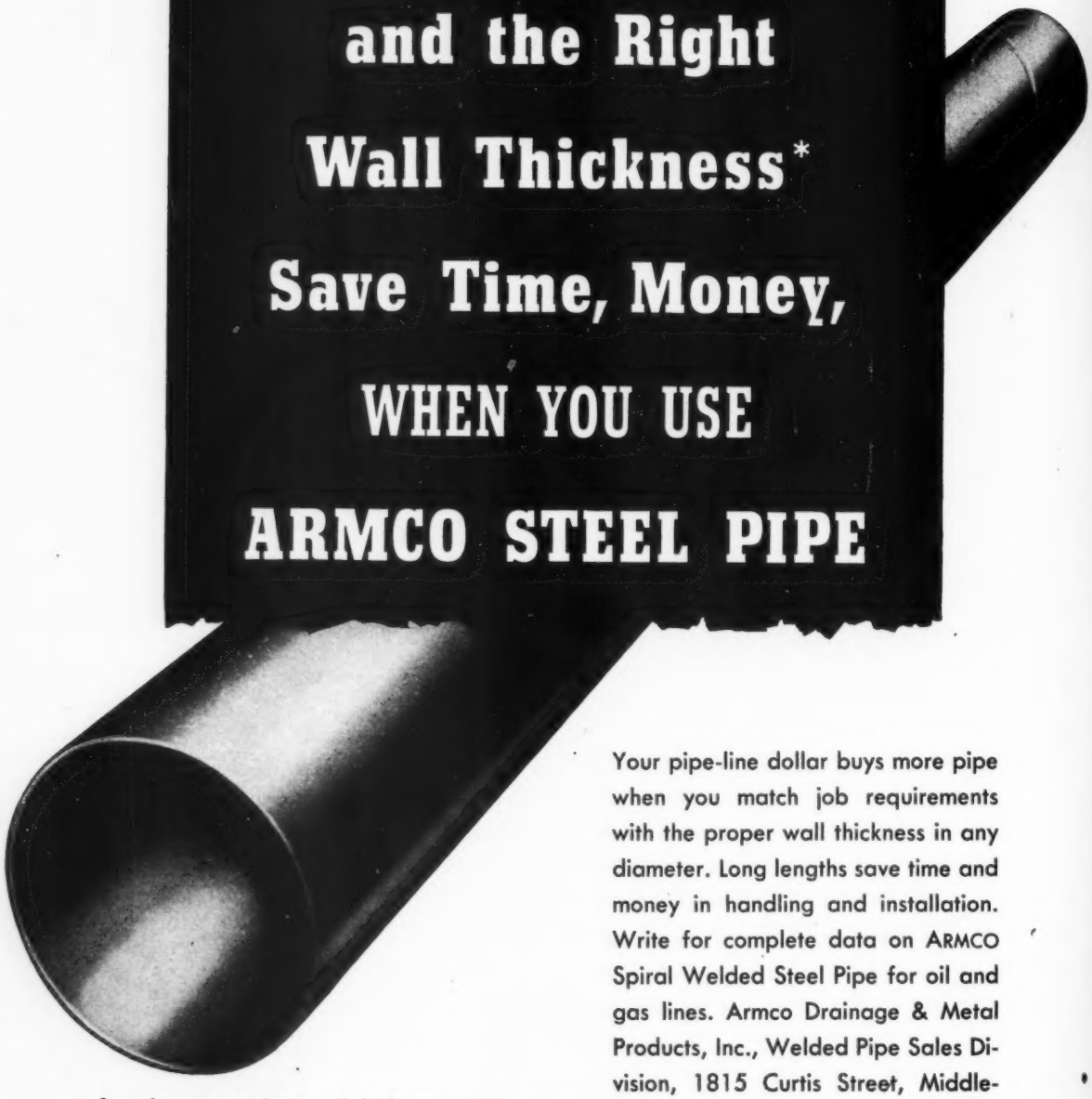




PENBERTHY PRODUCTS

PENBERTHY INJECTOR COMPANY
DETROIT 2, MICHIGAN
Established 1886 • **Canadian Plant, Windsor, Ontario**

LONG LENGTHS and the Right Wall Thickness* Save Time, Money, WHEN YOU USE ARMCO STEEL PIPE



Your pipe-line dollar buys more pipe when you match job requirements with the proper wall thickness in any diameter. Long lengths save time and money in handling and installation. Write for complete data on ARMCO Spiral Welded Steel Pipe for oil and gas lines. Armco Drainage & Metal Products, Inc., Welded Pipe Sales Division, 1815 Curtis Street, Middletown, Ohio. 501 Mayo Bldg., Tulsa, Oklahoma.

Export: The Armco International Corporation

* Lengths up to 50 feet, wall thicknesses 9/64- to ½-inch, diameters 6" to 36".

ARMCO WELDED STEEL PIPE

ARMCO

Commerce Department Bows Out of Voluntary Steel Allocation Fuss

WASHINGTON. — The Commerce Department is stepping out of the picture and will let the oil industry fight its own battle with the steel manufacturers over the question of a formal voluntary allocation agreement for tubular goods and pipe.

Officials washed their hands of the matter after Acting Secretary of the Interior C. Girard Davidson loosed a blast against the steel industry for its refusal to make such agreements, in which he charged the steel manufacturers had jettisoned the allocations program in favor of less essential and "even frivolous" uses.

It had been the position of the steel products advisory committee that the pipe mills were working at capacity and could neither produce more nor furnish more to the oil industry under a formal allocations agreement. Figures cited in support of that contention showed that during the first half of this year, oil and gas operators received something over 2,000,000 tons of steel, as against 3,150,000 tons for all of 1947.

Krug Asks Reconsideration

Commerce Department officials agreed with the steel industry that nothing would be gained by making voluntary allocation agreements for tubular goods and pipe, but Secretary of the Interior J. A. Krug demurred, and some weeks ago asked that the committee reconsider the matter.

Krug was away from the city when the committee held its last meeting, but Davidson continued the attack and, failing to get any reaction from the committee, released a lengthy letter he had written the individual members, reminding them of their "solemn obligation" to protect the country against a recurrence of last winter's oil and gas shortage.

In his letter, Davidson charged that steel industry plans call only for the supply of "adequate materials for capacity production, (a) only to mills producing line pipe (as distinguished from drill pipe, tubing, casing, and other oil-country goods) and (b) only to such line-pipe mills as are integrated with the steel producers."

"I am compelled to protest vigorously your adamant refusal to enter into a voluntary agreement to allocate steel to independent line-pipe mills as well as to those integrated with steel producers, and to supply steel for mills producing drill pipe, casing, and tubing," he declared.

Davidson also asserted the industry has the authority and the duty to supply these needs and if the industry refuses "its failure must be construed as an admission either that the assurance which it and other opponents of the President's program (for mandatory allocation powers) gave were given with tongue in cheek; or that the steel industry is incapable of voluntarily regulating its affairs to distribute its product so as to provide for the nation's essential needs."

Anchorage Outside Ship Lane Proposed by Humble

HOUSTON. — Additional data has been filed with the U. S. Army Engineers Office in Galveston regarding the proposed restricted shipping lane off the entrance to Galveston Bay.

Shipping interests have asked the Army Engineers to establish an unobstructed path as wide as 8 miles in some proposals. This would prevent any drilling on several promising state leases held by oil companies in the area.

Humble Oil & Refining Co. submitting material to Col. B. L. Robinson, district engineer, suggested a lane 8,000 ft. wide, the same distance as between the Galveston jetties. For anchorage, Humble proposed a triangular area outside the recommended lane and yet close in to shore.

Humble pointed out an anchorage outside the lane would be in the interests of safety. Humble, like other companies involved, has expressed a willingness to work out a solution to the problem fair to both oil and shipping.

On the side of the shipping group, W. F. Heavy, Houston port manager, wrote Colonel Robinson supporting an 8-mile wide lane. He protested the granting of three Stanolind Oil & Gas Co. drilling applications.

Oil Firms Join In Reserve Corps Plans

WASHINGTON. — Reserve organizations which will join in the Organized Reserve Corps affiliation program are being set up in plants of a number of oil companies.

A report of new units from the Army Department shows that an Engineer Petroleum Distribution Company has been formed in General Petroleum Corp., Los Angeles; an Engineer Base Depot, Headquarters and Headquarters Company in Shell Oil Co., Inc., Wood River, Ill.; a Chemical Smoke Generator Battalion, Headquarters and Headquarters Detachment, American Oil Co., Baltimore; a Quartermaster Petroleum Products Laboratory Base, Skelly Oil Co. El Dorado, Kans., refinery; and a Quartermaster Base Petroleum Supply Company, Mid-Continent Petroleum Corp., Tulsa.

Next Week

Sulfur in Petroleum.—New research studies commenced by A.P.I., U. S. Bureau of Mines, and Northwestern University. In this picture story of what's to be done by the group, the Journal also prints a most unusual and interesting full-page map of "the composition of petroleum" prepared by Harold M. Smith of the U. S. B. M.

Lion Oil's Refinery at El Dorado, Ark.—New cat cracker processes sour gas oil, economically, efficiently. Equipment design, yield percentages; also given are comparisons of processing Arkansas sour crude versus high-sulfur Near Eastern and Venezuelan crudes.

Determination of Cycling Efficiency in Cotton Valley (La.) Field Gas Reservoir.—Feature article by Ralph L. Hock, chief petroleum engineer for Cotton Valley Operators Committee.

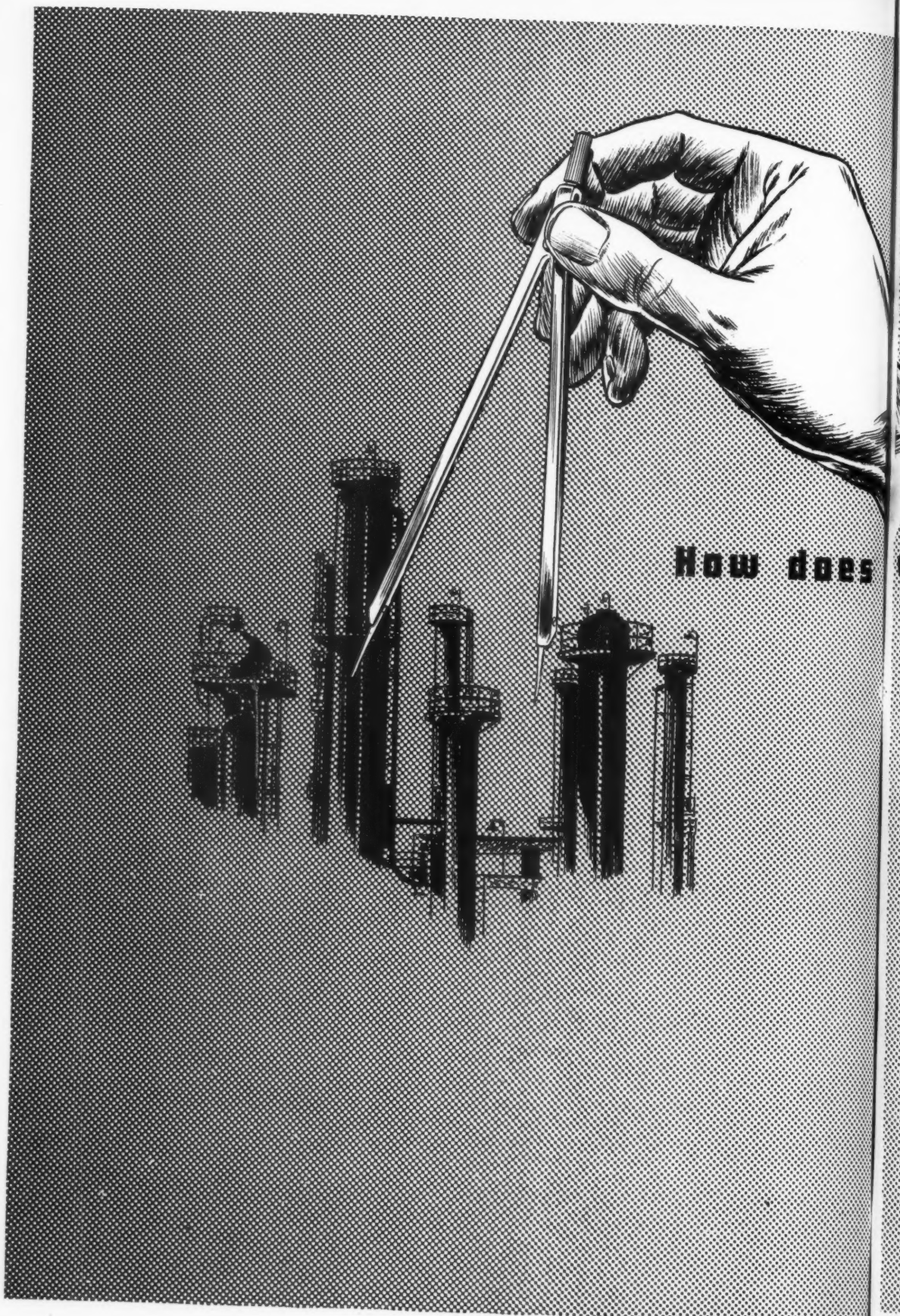
Drilling in Active Fields.—Ownership map, type electric log, and drilling conditions for Arch field, Matagorda County, Texas.

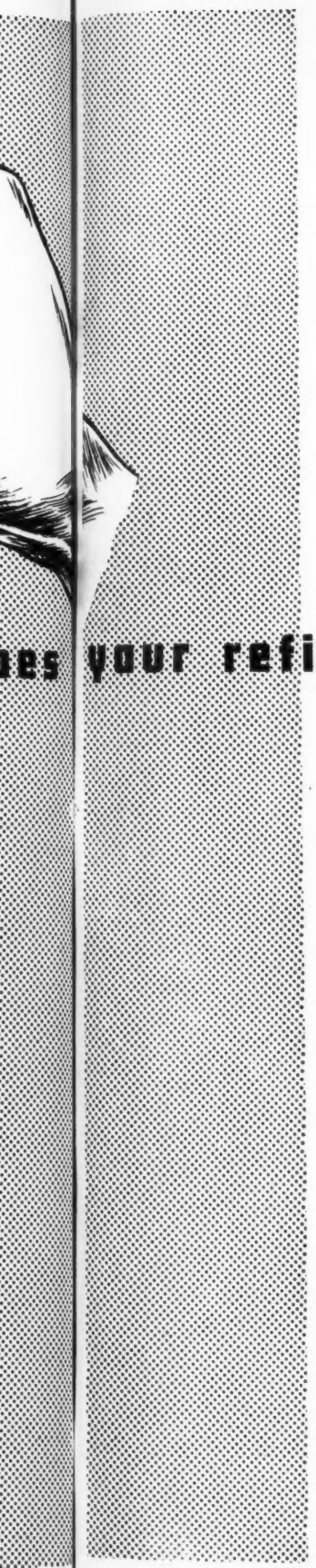
New Liner-Setting Method in World's Deepest Producer.—Procedure used in Pure Oil Co.'s 1 West Poison Spider, Natrona County, Wyoming, 14,309-ft. oil well.

Offshore Gas Pipe Line.—The Journal's pipe-line editor describes design and construction work of new Gulf of Mexico marine pipe line off lower Texas Gulf Coast.

AND...

The Journal again presents another of its periodic special nine-page reports detailing all construction work in refineries and petrochemical plants, both domestic and foreign, and construction projects for gasoline, L.P.G., and all types of natural-gas processing units. These tabulations separately cover projects announced, those in progress, and those recently completed.


How does yo



...es your refinery measure competitively?

With demand still far ahead of supply . . . with your refinery and those of your competitors operating at peak capacity . . . with no doubt as to your ability to market all of your production . . . actual experience certainly will not give you the answer. But what about tomorrow, when new facilities are placed in operation?

To meet the coming competitive market, you must have the answer today.

Universal can give you that answer *now* . . . plus assistance in maintaining the efficiency and economy of your operation in the face of future competitive problems.

UNIVERSAL OIL PRODUCTS COMPANY

UOP

General Offices: 310 S. MICHIGAN AVE., CHICAGO 4, ILLINOIS, U.S.A.
LABORATORIES: RIVERSIDE, ILLINOIS

Universal Service Protects Your Refinery

PERSONALS

J. E. Gray Is Manager of Shell's New Division

WHEN the production department office of Shell Oil Co., Inc., at Centralia, Ill., was elevated from district to division status in June this year, J. E. Gray, who had been district superintendent there, was named production manager of the new division.

After studying petroleum production engineering at Texas A. & M. College, Gray joined Petroleum Producers, Wichita Falls, Tex., to be in charge of repressuring activities for the company. Gray became interested in gas repressuring and pressure maintenance in the early days of his career when he was working in North Central Texas.

Gray joined the Shell organization in 1941 as petroleum engineer when that company acquired the properties of Petroleum Producers. After serving with Shell for some time in Tulsa he was transferred to Pratt and later to McPherson, Kans. In the latter part of 1943 Gray became district superintendent at Pampa, Tex., and in 1946 was transferred to Centralia, Ill., as district superintendent, which position he held at the time of his recent promotion.

As production manager of the new division Gray's area of supervision will include the company's holdings in Illinois, Michigan, Indiana, and Kentucky.

James W. Rees, personnel director of Pure Oil Co., has been appointed an industry advisor for the Petroleum Conference of the International Labor Organization, which will meet in Geneva, Switzerland, November 9. Prior to the Geneva meeting, Rees will attend preliminary meeting of the group in London.

Robert G. Behrman, Jr., formerly with Gulf Oil Corp., Houston, has joined **Cecil Hagen,** oil producer of Houston.

William T. Greed, Esso Standard Oil Co., Bayonne refinery, has been made general foreman, pipefitting department, replacing **Michael F. O'Brien,** who retired from active service. **John L. Birkler** succeeded Greed as assistant general foreman. At their Bayway refinery Esso has promoted **Roy W. Thomas** to co-ordinator of the Bayway expansion program, replacing **John B. Hanna,** who has been assigned to follow up field construction connected with the program for fuel-products expansion; **Louis E. Ehresmann** is to work with **John Hooten** in coordinating the program of chemical products expansion; **John D. Graham** to technical assistant to **William D. Morrison,** who is in charge of alcohol and "I" plant operations.

Arden E. Ross, Tulsa attorney, has joined the legal department of Amerada Petroleum Corp. in Tulsa.

Allison J. McNay has been named supervisor of a new education division in the public relations department of Standard Oil Co. of California. He will direct the development of petroleum educational material for students and teachers from primary to college levels.

U. E. Neese is establishing offices at Calgary, Alta., where Tideland Exploration Co., Houston, is extending its operations. Neese will direct the geophysical work contracted in that area.

R. M. Stephens, Humble Oil & Refining Co., Houston, and **Leonard H. McMahon,** American Oil Co., New York, have been appointed to the aviation technical service committee and the lubrication committee, respectively, in the division of marketing of the American Petroleum Institute.

Robert E. L. Rowland, senior employe of Stanolind Pipe Line Co. and aide to **C. M. Scott,** assistant general manager of operations, has retired after 32 years of service with the company. Rowland plans to move from Tulsa to Columbia, Mo., where he will practice corporate law.

F. Marshall Tarr, manager of refined products in the merchandising department of Standard Oil Co. (Ohio), Cleveland, Ohio, has been named manager of the Mansfield sales division.

W. F. Gilbert, equipment engineer for Asiatic Petroleum Corp., is being transferred to The Hague where he will work with **Henry Hohmann,** an equipment executive of Royal Dutch-Shell. Gilbert is expected to be in Holland for about 2 years.

J. H. Wharton, equipment engineer for Gulf Oil Corp., has returned from an extensive tour of Kuwait. He also visited Gulf's London office.

R. N. HASTINGS

R. N. Hastings, formerly district superintendent at Ulysses, Kans., for Stanolind Oil & Gas Co., has been named district superintendent at Alvin, Tex., for the company. He succeeds **F. C. Beleau,** who was made division drilling superintendent for Stanolind at Casper, Wyo. A graduate of Colorado School of Mines, Hastings joined Stanolind in 1933. He served 2 years as superintendent of the gasoline plant at Salt Creek, Wyo., and more than 3 years as field superintendent there. He also was operating superintendent of manufacturing for 2 years.

F. C. Whiteside, formerly division engineer of the northern division of Interstate Oil Pipe Line Co., has been appointed chief engineer for the company. Sam Phelps, formerly an engineer in the northern division engineering department specializing in mechanical problems and design, will succeed Whiteside. Both will continue to make their headquarters in Tulsa. Major engineering functions have been assigned to the expanded staff engineering department headed by **Joe C. Rawlins,** chief engineer. **S. C. Mishou,** division engineer for the southern division with headquarters in Shreveport, La., will continue his duties there.

Gavin Witherspoon, vice president in charge of production, Bahrein Petroleum Co., Ltd., will return to New York about November 15 from Bahrein Island where he has been since last December. After a visit in the United States, Witherspoon will return to Bahrein.

J. T. Robb, assistant secretary and assistant treasurer, Great Lakes Pipe Line Co., has been elected comptroller. **G. A. Welch,** accounting department, will succeed Robb.

Dr. Charles P. Berkey, Newberry professor emeritus of geology at Columbia University, has been awarded the Kemp Medal "for distinguished service in geology." The award was made by Dwight D. Eisenhower, president of Columbia. Berkey is the first recipient of the award which was established last year in honor of the late James Furman Kemp, founder of the geology department and a pioneer in the field of engineering geology. Executives of 19 of the major extractive industries were among those present.

R. B. Roaper, chief safety engineer for Humble Oil & Refining Co., was scheduled to sail last week for Europe en route to Geneva, Switzerland, where he will attend the annual meeting of the International Labor Organization as the American petroleum industry's safety representative. He is to travel in Italy and France before returning late in November.

H. V. Peterson, treasurer of Hartol Petroleum Corp., has been elected a vice president of the company, it was announced by **W. Chalmers Burns,** president.

D. A. Klemme, safety supervisor of Stanolind Oil & Gas Co., has been named chairman of the petroleum section of the National Safety Council for the coming year. **J. Doyle Settle,** secretary of the American Association of Oilwell Drilling Contractors, Dallas, Tex., has been elected head of the newly created drilling and exploration safety group in the petroleum section of the National Safety Council.

V. J. Mercier, district engineer for Lane-Wells Co., has been elected chairman of the Kansas chapter of the American Institute of Mining and Metallurgical Engineers.

Charles K. Slack, assistant treasurer of General Petroleum Corp., was elected vice president of the Tax Executives Institute, national association of tax men, at their recent annual convention in Bretton Woods, N. H.

George V. Holton, chairman of the board of Socony-Vacuum Oil Co., Inc., was the principal speaker at the annual dinner of members of the company's 20-Year Club in New York recently. **James Ross,** assistant manager of General Petroleum Corp.'s purchasing department, headed that company's 20-Year Club which held its annual dinner in Los Angeles recently.

Isaac L. Ault has been named superintendent of Magnolia Petroleum Co.'s newly created Louisiana-Gulf division at Morgan City, La., which will handle all of the company's offshore operations in the Gulf of Mexico. Previously, such matters were under the jurisdiction of the Houston and Lake Charles offices. **Herschel V. Harden** has been named superintendent of the new Louisiana-Gulf district, organized concurrently with the division, and having the same address.

M. B. Standing, California Research Corp., La Habra, Calif., has been appointed general chairman of the Pacific Coast district of the American Petroleum Institute spring meeting to be held in Los Angeles, May 12-13 next year, it was announced by **Lot Bowen,** Pacific Coast district chairman of the A.P.I. division of production.

Phillip H. Moore, partner in the firm of Moore & Barrett, Surrey, England, petroleum analysts and cargo control specialists, will take charge of the New York office of Moore, Charlton & Associates, Inc. Moore will arrive in the United States next month.

Darsie A. Green, formerly district geologist for Pure Oil Co. at Olney, Ill., has been transferred to Newark, Ohio.

Fred H. Taylor has been named head of Phillips Petroleum Co.'s land office in Great Falls, Mont. The office has recently been moved from Salt Lake City, Utah, to Great Falls. **Owen Jones, James W. Heath,** and **T. H. Frison** will assist Taylor.

Casper T. Olien, Oilmont, Mont., has been named Montana vice president of the Independent Petroleum Association of America.

Haynes B. Ownby, president, Haynes B. Ownby Drilling Co., Dallas, was elected commander of the 169th Aero Squadron with which he served in the First World War at their annual reunion in Dallas, October 16-17.

Haskell Robinson, district scout at Evansville, Ind., for Phillips Petroleum Co., has been transferred to the Denver, Colo., office as chief scout for the Rocky Mountain division. He has been succeeded at Evansville by **Nelson E. Caldwell,** formerly of the Houston office.

Vannevar Bush, retiring president of the research and development board of the national military establishment, has been chosen to receive the 1949 Industrial Research Institute medal awarded for outstanding contribution to the field of industrial research.

Louis Sonnen, purchasing agent for Tennessee Gas Transmission Co., has been elected president of the T.G.T. Houston Employes Club.

Virgil Fletcher, who formerly worked in Venezuela for the Royal Dutch-Shell interests, will take up new duties soon with Shell in the Netherlands East Indies.

David B. Burrows has been appointed senior research engineer in charge of the fluid-hydrocarbon section of Continental Oil Co.'s production research laboratory in Ponca City, Okla. Burrows is a graduate of Oklahoma A. & M. College in Stillwater, Okla., with a degree in chemical engineering. He was formerly chemical engineer for a Tulsa oil company and engaged in reservoir engineering work. The section that Burrows will direct will make all analysis on bottom-hole samples and condensate wells.

Dr. Roberto Valverde, director of the Geological Institute at the University of San Marcos, Lima, Peru, is on an official mission from the Peruvian Government Oil Co. (E.P.F.) to initiate negotiations for construction of the 7,000 to 9,000-bbl.-daily refinery which the company plans to build in the Port of Callao. He is also making arrangements with oil companies in the United States for graduate engineers from the University of San Marcos to do engineering work, and for Peruvian students to take undergraduate and graduate work in the United States. Students accompanying Valverde include **Arturo Tresierra, Ruben Cardenas, Felix Guerra,** and **Jorde Carranza.** Valverde will return early next month.

Eight petroleum engineers from various offices in all four operating divisions of Stanolind Oil & Gas Co. are now in Houston as a part of an 8-week company course on drilling mud. In the group are: **F. K. Krebill, H. L. Howard, C. E. Jennings, C. A. Einarsen, H. E. Rowe, H. A. Nelson, T. C. Priest,** and **J. T. Walker. R. B. McCloy,** assistant operating superintend-

Socony-Vacuum Executives Discuss 1949 Activities

MEETING in Chicago last week were more than 200 manufacturing and research executives of Socony-Vacuum Oil Co., Inc., and subsidiary companies, discussing next year's plans and activities. Offshore drilling operations, domestic and foreign marketing activities, and the company's participation in Middle East development were discussed.

Some of the executives attending the meeting and shown in the picture are: G. L. Adams, member of board, General Petroleum Corp., Los Angeles; T. L. Apjohn, Paulsboro, N. J.; C. P. Baker, refinery manager, East St. Louis, Ill.; L. C. Beard, assistant director, Socony-Vacuum laboratories; M. H. Burkhard, patent department; W. F. Burt, vice president and director; A. E. Chester, member of board, Magnolia Petroleum Co., Dallas; H. C. Cortes, assistant manager, exploration division, Magnolia Petroleum Co.

J. H. Curtis, Torrance, Calif., refinery, General Petroleum Corp.; S. D. Dalton, chief refinery engineer; A. V.

---

ent, and **C. F. Bedford,** chief production engineer, are in charge of the entire course, with **W. D. Smith** and **Tom A. Keating** handling the Houston phase.

O. A. Knight, president of the Oil Workers International Union (CIO); **A. R. Kinstley,** vice president; and **T. M. McCormick,** secretary-treasurer, have been reelected to their respective positions in the O.W.I.U.

Carl H. McAlister, chief geophysicist of Sunray Oil Corp., has resigned to enter consulting work. He has announced the opening of Consulting Geophysical Offices at Tulsa to specialize in the review and reinterpretation of seismic data in the Mid-Continent and Gulf Coast areas and the supervision of current geophysical activities.

Frank R. Long, vice president of Mohawk Petroleum Corp. and **Walter T. Wells,** chairman of the board of Lane-Wells Co., have been named to the board of trustees of West Coast University.

Edmond F. Wright, chairman of a committee to recruit key personnel from industry for the National Security Resources Board, has resigned.

E. C. Ayres, assistant superintendent at the Cactus plant in the Texas Panhandle for Phillips Chemical Co., has been named superintendent of the company's new fertilizer plant at Port Adams, Tex., near Houston. **Austin Morgan,** of the Cactus plant staff, succeeds Ayres. **A. J. Head,** maintenance superintendent of the natural-gas and gasoline department at Odessa, Tex., has been named mechanical and maintenance superintendent of the Plains-Butadiene plant at Borger, Tex.

Floyd B. Odlum, president of Atlas Corp., and **George H. Howard** of the law firm, Simpson, Thacher & Bartlett, both of New York City, have been named to the board of directors of Barnsdall Oil Co. Atlas Corp., which is a large stockholder in Barnsdall, was formed in 1923 by Odlum and Howard.

F. C. Boler, assistant manager of the real estate and right-of-way department for Standard Oil Co. of California, has been named manager of the office-buildings department for the company to handle all office buildings owned or leased by the company in San Francisco, Los Angeles, and Bakersfield.

Danner; E. B. Delgass, Brooklyn; G. S. Dunham, manager, midwest refineries; L. P. Evans, Paulsboro; W. L. Faust, vice president and director in charge of foreign trade; J. W. Glass, manager, Augusta, Kans., refinery; R. D. Hanley, member of board, Magnolia Petroleum Co.; C. L. Harding, director in charge of Middle East operations; J. H. Herbert, industrial relations department; W. M. Holaday, director of laboratories; D. L. Hooker, manager, eastern refineries.

R. R. Irwin, manager, White Eagle refineries, Kansas City; R. R. Jackson, manager, Paulsboro refinery; Sam Keller, manager, Trenton, Mich., refinery; J. C. Kerr, Beaumont, Tex.; R. B. Killingsworth, Brooklyn; R. B. Koppenhoefer, Brooklyn; J. L. Latimer, president, Magnolia Petroleum Co.; W. W. Leach, Beaumont; W. L. Linton, manager, East River refinery, Brooklyn; W. H. Montgomery, manager, industrial relations department; J. W. Newton, director, Magnolia Petroleum Co.; E. S. Nicholls, Paulsboro; A. A. O'Kelly, Paulsboro; E. T. Pummill, manager, Casper, Wyo., refinery; J. B. Rather, New York City; W. W. Reed, manager, East Chicago refinery; H. A. Rickett, manager, East Providence refinery; J. L. Risinger, safety supervisor.

T. G. Roehner, manager, technical service department, Brooklyn; H. W. Sheldon, New York City; T. P. Simpson, manager, research and development department, Paulsboro; C. S. Teitsworth, director in charge of manufacturing; L. H. True, director and manager, Magnolia Pipe Line Co.; E. J. Tully, Brooklyn; W. E. Wanner, manager, Olean refinery; L. B. Wheat, Beaumont.

DEATHS

James S. Meisner, 64, former distribution superintendent and gas consultant for United Gas Corp., died October 20 in Houston. He retired 2 years ago after 47 years in the gas industry.

Ray T. Thorsen, 42, assistant chief clerk of the credit and collections department of Humble Oil & Refining Co., died October 19 in Houston. He had been with Humble 23 years.

Col. Charles R. Taylor, 49, former independent oil operator and a veteran of both World wars, died October 23 in Tulsa.

John A. Jack Myers, 62, early-day oil operator in the Gulf Coast area who brought in the discovery well at Rio Grande City, Tex., in 1930, died recently in Houston.

David Garrett Kerr, 84, retired vice president of United States Steel Corp., died October 17 in Pittsburgh, Pa.

Edward H. Kares, 55, engineer, Standard Oil Development Corp., died September 26. He had served the company nearly 25 years.

Mrs. Maggie Mae Dabney King, 55, Dallas, Tex., oil woman, died recently in Tyler, Tex.

Rupert Wedermeyer, 58, geologist for Standard Oil Co. of California, was killed in an airplane crash October 21 near Prestwick, Scotland.

Roy Gregg, 49, drilling contractor in northeastern Michigan, was killed in an automobile accident October 19 in Sterling, Mich.

Felix R. Frederick, 45, senior exploitation engineer on the regional staff of Shell Oil Co., Inc., in Houston, died October 17 in Port Sulphur, La.

John W. Blaney, 54, superintendent of production for Standard Oil Co. of California in Ventura County, was killed in an automobile accident October 18 near Ventura, Calif.

Prevention of Corrosion in Sour Wells *with* Organic INHIBITORS

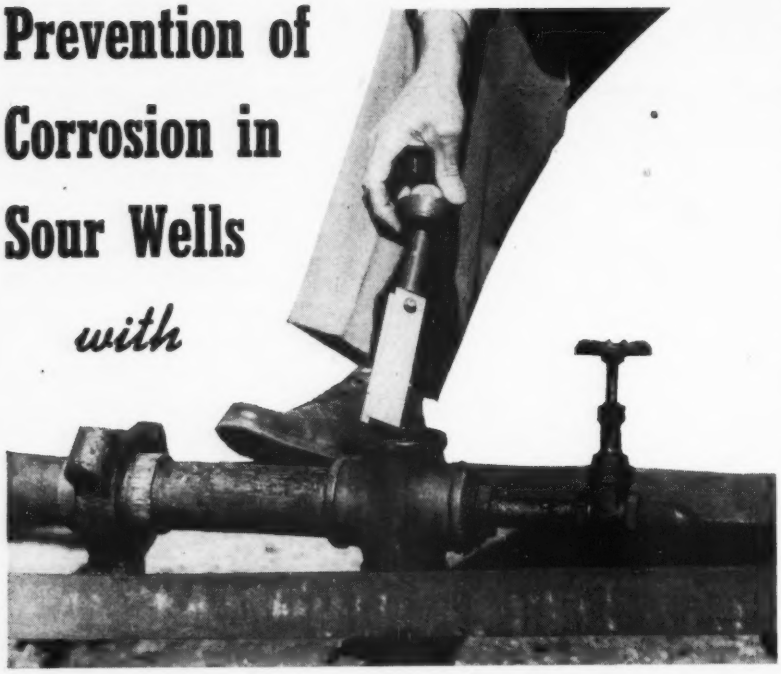


Fig. 1: Installation of test coupons in flow line at well head of a test well

by William F. Gross* and Howard W. Andrews*

IN considering the problem of corrosion in oil or gas-well equipment, three broad methods of corrosion control are generally contemplated, namely:

1. Changing the nature of the corrosive fluids.
2. Changing the nature of the corroding metal.
3. Insulating the metal surface from the corrosive fluids.

The present paper discusses an investigation of corrosion mitigation classed under Method 3, in that it presents the results of a carefully controlled 18-month field test of four commercial organic corrosion inhibitors in sour, West Texas oil wells.

These inhibitors, sold under the name "Kontol," are reagents developed specifically for oil-field use. They are composed of mixtures of complex organic semipolar compounds which are strongly adsorbed to form invisible protective films upon metal surfaces. These films greatly decrease the rate of diffusion of corrosive elements in the produced fluids to the metal surface, thereby largely preventing the over-all corrosion, and eliminating the tendency toward pit formation. The film is apparently held to the metal by a firm chemical bond,* so that once it is well established over the metal surface protection is afforded for some time after treatment of the well has stopped.

The corrosion preventives discussed show negligible reaction with salts carried by the brine, and do not raise the pH of the brine with the resultant danger of calcium or magnesium precipitates plugging the well or formation. They are not limited by the amount of hydrogen sulfide present in the brine for effective corrosion control, as has been reported to be the case with some other corrosion inhibitors, but are equally effective in wells producing sweet brines, or brines saturated with hydrogen sulfide.

*Petrolite Corp., Ltd., Tretolite Co. Division, St. Louis.

*Hackerman, Norman, Corrosion, 4, No. 2, 15 (1948); and private correspondence.

TABLE 1—PHYSICAL PROPERTIES OF KONTOL CORROSION PREVENTIVES

Compound name—	Kontol 110	Kontol 115	Kontol 116	Kontol 118
Density, 60° F.	0.954	0.937	0.958	0.957
A.P.I. grav., °F.	16.9	19.5	16.2	16.3
Flash point, °F.	194	212	140	165
Fire point, °F.	217	248	185	225
Pour point, °F.	10	30	0	—30
Visc, 100° F., S.U.S.	900	170	105	477
Solubility in brine	No	No	Yes*	Yes*
Solubility in oil	Yes	Yes	Yes	Yes

*Note: Spontaneously dispersible to produce a stable emulsion.

The physical properties of the Kontols tested are recorded in Table 1.

Field test procedure.—For these tests, six notably corrosive sour wells were chosen in the Permian basin from the Odessa, Tex.-Hobbs, N. M., area. They were treated with Kontol corrosion preventives by means of chemical proportioning pumps, or by batch dumping down the casing annulus once a day.

Corrosion rates were determined by the insertion of pairs of test coupons in the flow stream at the well head, and by running short, tared lengths of tubing and rods throughout the well strings. Brines were analyzed for dissolved salts, chlorides, and hydrogen sulfide. An analysis of the brine for dissolved iron was not applicable in these tests due to the presence of hydrogen sulfide which converted the iron to insoluble iron sulfide.

The test coupons were 1,020 steel plates 5 by 1¼ by $\frac{1}{8}$ in. in dimensions, resulting in an area of 12.4 sq. in. per coupon being exposed to the well fluids. The rate of corrosion was obtained from the weight loss, and recorded as mills penetration per year (m.p.y.), where 1 mill = 0.001 in.

These coupons were tested in pairs supported on a plastic chuck which electrically insulated them from one another and from the well tubing. The plastic chuck was rigidly attached to a 2-in. plug, so the whole unit could be inserted into the flow stream at any cross or tee. The installation of a set of test coupons in the flow line at the head of a test well is shown in Fig. 1. Note that these were inserted in a vertical section of the flow line, in order that both surfaces of both coupons would receive the same treatment.

The coupons were freshly sand blasted before each test. This was found necessary in order to eliminate completely the firmly adhering protective film formed on the surface during a previous exposure. Before assembly in the chuck, the coupons were pickled in dilute (8 per cent) c.p. hydrochloric acid, followed by washing, drying in acetone, and weighing to 0.0001 g. At the end of the 2-week test the coupons were cleaned in carbon tetrachloride, carefully pickled in dilute hydrochloric acid until the rapid evolution of hydrogen sulfide ceased, and then scrubbed in soapy water, rinsed, dried, and again weighed to 0.1 mg. The weight losses of the pairs of plates usually checked very closely.

The pup joints and pony rods used in determining corrosion rates were 8-ft. lengths of Norris type H-40 tubing and

TABLE 2—DESCRIPTION OF THE SIX TEST WELLS

	1	2	3	4	*5	6
Date of completion—	12-30-36	4-24-37	11-9-39	12-16-44	8-21-29	1940
Production section—	Grayburg	Grayburg	Grayburg	Clear Fork	Grayburg	San Andreas
Well statistics:						
Well depth	2,506	2,510	2,395	3,225	2,971	4,570
Casing depth	2,286	2,278	2,347	3,280	2,741	4,186
Tubing depth	2,499	2,479	2,386	3,175	2,925	4,520
Daily production:						
Oil (bbl.)	14	9	18	15	*40	22
Gas (M.c.f.)	1	1	1	10	2	....
Brine (bbl.)	1½	2	2	25	*250	19
Brine analysis:						
Total salts (p.p.m.)	38,000	47,000	89,000	.....	.....	.....
Chlorides (p.p.m.)	28,000	35,300	32,100	38,400	8,700	48,000
H_2S (p.p.m.)	800	850	1,560	880	1,030	300
Fluid levels, ft. above pump:						
Hours pumped per day	8	8	8	24	24	24
Static level	300	300	.....	.....	900	800
Pumped level	.....	.....	.....	.....	300	.....

*Note: After January 1948, the daily production in well 5 was: oil, 30 bbl.; brine, 300 bbl.

Norris type 30 rods, respectively. Only new test rods were employed. The used pup joints which were employed in wells 1 and 2 were mechanically wire brushed over all surfaces before pickling and weighing. The new pup joints employed in well 5 were thoroughly sand blasted over all surfaces before cleaning.

Before and after exposure, the subsurface test equipment was cleaned by scrubbing in gasoline, pickling in dilute hydrochloric acid, and then rinsing, drying, and weighing to within 1 g.

Program of testing.—Six wells were chosen as representative of those experiencing serious corrosion due to hydrogen sulfide. Wells 1-5, inclusive, were located in Crane County, Texas, while well 6 was situated in Lea County, New Mexico.

Some of these wells were on intermittent production, with resulting fluctuations in fluid levels, while others were produced continuously, and were nearly pumped off. The brine-oil ratios varied greatly in these wells, as did also the hydrogen sulfide content of the brine.

For their detailed statistics, see Table 2.

Subsurface test equipment—rod and tubing subs—were employed in wells 1, 2, and 5 for 12-week exposure periods. Pairs of test coupons were inserted in the flow stream at the well head of all six wells for 2-week exposure periods, and in addition were also inserted 230 ft. down the flow line of well 3.

The Kontol corrosion preventive was introduced down the annulus of wells 1, 2, 3, and 5 by means of chemical proportioning pumps. The other wells were treated by batch dumping once a day. There were no noticeable differences in results obtained by these two methods of treatment. The treating rate was based upon the crude-oil production of the well, and is recorded as the ratio of parts by volume of Kontol used to parts by volume of crude oil produced.

The program of treatment for each well will be apparent from the tables and graphs of the results obtained.

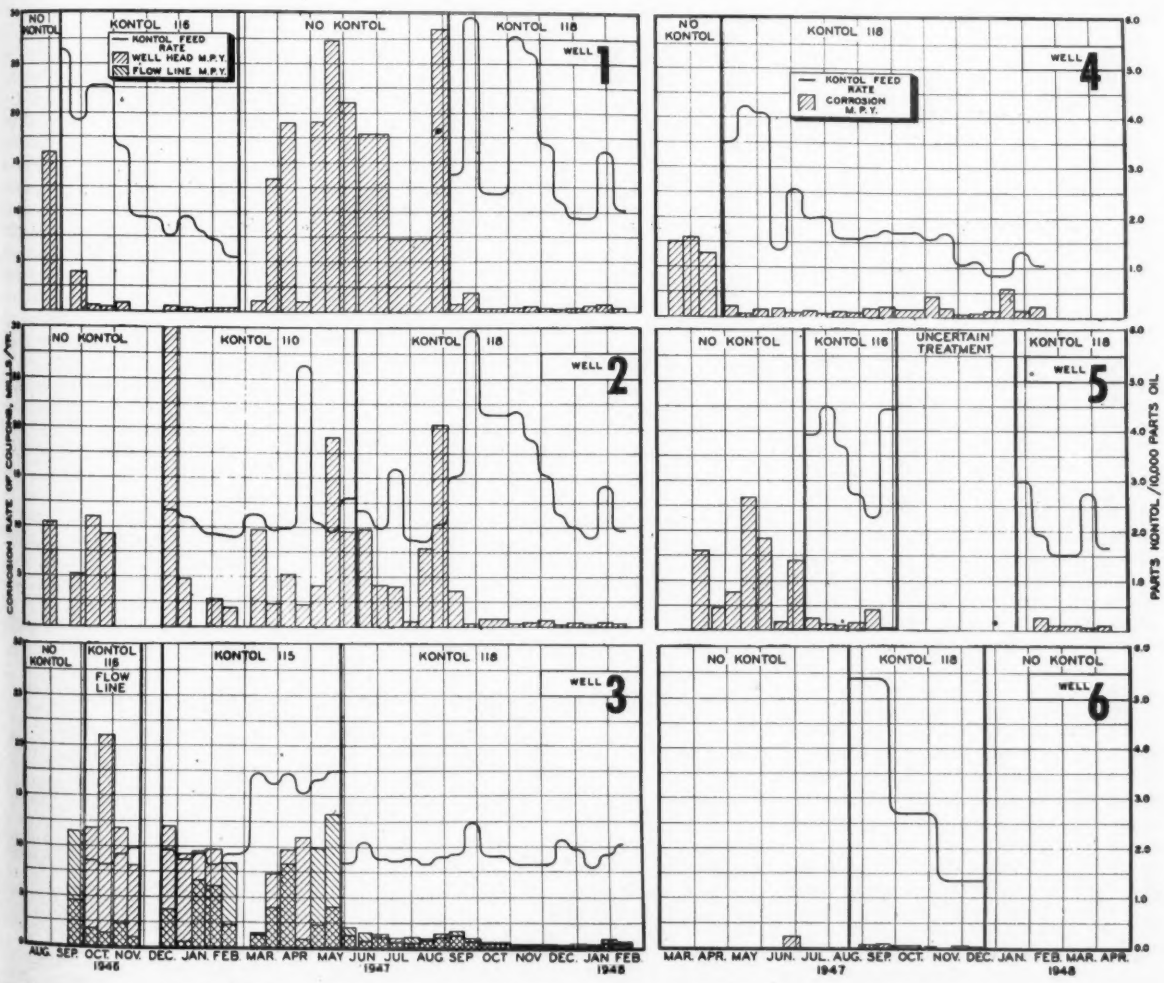


Fig. 2: History of coupon corrosion, and Kontol treating rate during the entire period of test

Coupon test results.—Test coupons at the well head indicate the conditions of corrosion at the well head only. With sour, pumping wells, the corrosive conditions at the well bottom (up to the static fluid level) are usually much worse than at the well head. However, in West Texas conditions at the well head are usually sufficiently severe to give a good indication of the greater corrosion occurring below the fluid level.

The coupon results for a period during which the well was pulled are unreliable. These results usually indicate that abnormally high rates of corrosion are occurring in the well, due to exposure of the coupon to the atmosphere while the well is being pulled. Another error involved in the use of coupons lies in the weight loss sustained in the cleaning operation. However, this loss was kept below 5 mg. (0.005 g.).

The coupon test results for all six wells are presented in Fig. 2. In the graphs in this figure, the rate of corrosion of the coupons, expressed as mills penetration per year (m.p.y.), is plotted for each test period for the entire 18 months. Bar heights represent the average of the corrosion rate (in m.p.y.) experienced by the pairs of coupons for each test period. The width of the bar represents the number of days of test, which in nearly all cases was 14. Also recorded is the Kontol feed rate for each coupon test period. This is plotted as the parts by volume of Kontol fed per 10,000 parts by volume of crude oil produced.

The results given in Fig. 2 are best discussed on a well-to-well basis:

Well 1.—Treating this well with Kontol 116 at a rate of 1½ parts for every 10,000 parts of oil produced reduced the rate of corrosion from 20 m.p.y. to 0.4 m.p.y.—a 98 per cent reduction. Treatment was stopped on February 25, 1947, yet coupons exposed between March 5, 1947 and March 19, 1947—between 1 and 3 weeks after treatment was stopped—indicated the lingering effect of Kontol protection since they showed a corrosion loss of only 1.0 m.p.y.

Subsequent treatment, with Kontol 118, resulted in a rapid decrease in the corrosion rate until the low value of 0.3 m.p.y. was reached—an indicated 98.5 per cent protection.

Well 2.—Kontol 110 reduced corrosion in this well by 50 to 75 per cent, as judged by coupons at the well head. Kontol 110 might have afforded better protection if a higher treating rate had been employed during the first 2 to 4 weeks. The importance of treating initially at a higher rate is clearly illustrated by the results obtained when Kontol 118 treatment was started at 2 parts per 10,000. No marked protection was obtained until the daily treating rate was increased to 4 parts per 10,000. At this higher rate of treatment, the protective film was quickly established and the corrosion rate dropped to 0.3 m.p.y., which was then maintained after the treating rate was subsequently reduced to the original rate of 1 part per 5,000.

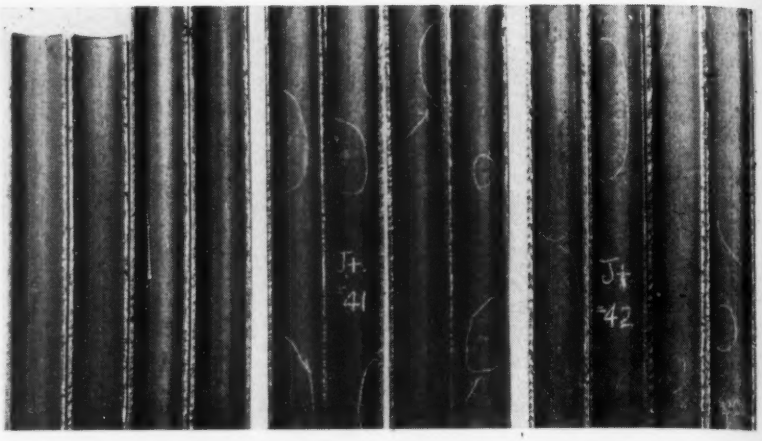


Fig. 3: Interior surface of test joints Nos. 41 and 42 after 12 weeks exposure in well 1, with no treatment, compared with the original condition of these surfaces. Joint No. 41 located 30 ft. above the pump, weight loss 322 g. Joint No. 42 located 300 ft. above the pump, weight loss 388 g.

Well 3.—The rates of corrosion of the coupons at both the well head and at a spot 230 ft. down the flow line are presented for this well, making possible a direct comparison. The unprotected rate of corrosion at these two locations was the same. Kontol 116 was first fed to the flow line only, resulting in a good reduction in corrosion of the flow-line coupons, but, of course, not effecting the corrosion of the well-head coupons. Kontol 115, introduced down the well annulus, exhibited only a slight effect on corrosion due to hydrogen sulfide. Soon after treatment of the well with Kontol 118 was started, however, the corrosion rate of both the well head and flow line coupons was maintained at the low value of 0.2 m.p.y. It was believed valid to conclude that the treatment of a well for corrosion with Kontols 116 or 118 will in time fully protect the flow line from that well.

Well 4.—Again it was indicated by coupons that once the protecting film has been established upon the metal surface by treating at relatively high rates, protection is maintained at considerably lower Kontol injection rates. A treating rate of 1 part per 10,000 parts produced oil in this well corresponds to a feed rate of ½ pt. a day. It is believed, however, that to insure complete protection a minimum feed rate of 1 pt. per day should be maintained.

Well 5.—The frequent shut downs during the period of no treatment (see Table 4, footnote 1) produced erratic coupon results during this period. The trend during treatment with Kontol 116 is clearly downward toward lessened corrosion (neglecting the high value during the middle of September, when the well was pulled and the coupons were exposed to air for 2 days). After repair of the surface equipment, treatment was resumed on February 6, 1948, with Kontol 118. Results in this well were better than expected from a consideration of the poor condition of the well equipment.

Well 6.—The corrosion rate of the coupons was maintained at the low value of 0.2 m.p.y. (It is believed that corrosion rates under 0.4 m.p.y. indicate that excellent protection has been established).

Subsurface-equipment test results.—Subsurface test equipment, consisting of 8-ft. tubing and rod subs, were employed in wells 1, 2, and 5. These were run in the well strings at three locations: at the well bottom, at the static or pumped fluid level (loca-

TABLE 3—SUBSURFACE EQUIPMENT TEST RESULTS, WELL 1

	Wt. loss of subsurface equipment, grams				
	9-11-46-12-4-46 Kontol 116	12-4-46-2-25-47 Kontol 116	5-30-47-8-28-47 Blank	8-29-47-11-26-47 Kontol 118	11-27-47-2-19-48 Kontol 118
Position in well—	1/2,580	1/6,300	0	1/2,660	1/4,670
Jt. 30 ft. above pump	56	65	322	29	12
Jt. 300 ft. above pump	48	48	388	23	27
Jt. 100 ft. below surface	49	62	39	30	24
Rod 25 ft. above pump	1	.	127	11	1
Rod 300 ft. above pump	..	.	194	11	2
Rod 100 ft. below surface	4	..	15	13	1
Bottom coupling	..	.	40	..	5
300 ft. coupling	..	.	14	3	3
Top coupling	.	..	9	2	..

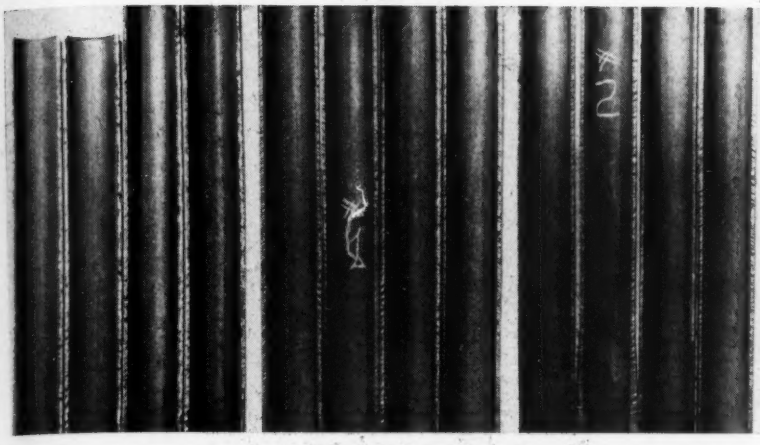


Fig. 4: Interior surface of test joints Nos. 1 and 2 after 12 weeks' exposure in well 1 treated with Kontol 118, compared with the original condition of these surfaces. Joint No. 1 located 30 ft. above the pump, weight loss 29 g. Joint No. 2 located 300 ft. above the pump, weight loss 23 g.

tions of estimated greatest corrosion) and at the well head.

The weight losses suffered by this equipment in well 1 during exposure periods of approximately 12 weeks is recorded in Table 3. It is apparent that at the probable static fluid level (300 ft. above the pump) the rate of corrosion was 10 times that at the surface. Kontol 116 or 118, however, reduced the corrosion at all locations to the same low rate experienced at the well head.

Kontol 116 afforded from 80 to 88 per cent protection throughout the region of greatest corrosion, while Kontol 118 afforded from 93 to 96 per cent protection in this region. The rods are apparently protected to an even greater extent—from 99 to 100 per cent for both Kontols 116 and 118.

After cleaning and weighing, a few of the pup joints were cut open and inspected for pitting. The pitted condition of the interior surfaces of the joints after a 12-week exposure in well 1, without treatment, is compared with the original condition of the surfaces in Fig. 3.

Test joints exposed during the following 12 weeks, during which the well was being treated with Kontol 118, showed no noticeable change in the surfaces when compared with the original surfaces—Fig. 4.

The results of a similar subsurface test in well 2 are recorded in Table 4, in which the weight losses for the 68-day blank run are extrapolated to a test of 85 days for purposes of comparison.

The subsurface test equipment verified the well-head coupons in showing the importance of first establishing the protective film before reducing the treating rate to the minimum which will maintain that film. Perhaps a 50 per cent reduction in corrosion was obtained between May 28, 1947, and August 27, 1947, while between 87 per cent protection (as indicated by the pup joints) and 100 per cent protection (as indicated by the pony rods) was afforded after the protective film had been established.

In well 5, subsurface equipment was located at the well bottom and at the approximate static fluid level —the two locations of estimated greatest corrosion.

The results of 85 days' exposure with no treatment given to the well, as compared with results during periods of treatment with Kontol 116 and Kontol 118, are recorded in Table 5. The pup joints indicated that from 70 to 86 per cent protection was afforded, while the pony rods indicated a rod protection from 86 to 91 per cent, by the use of Kontol 116. Kontol 118 provided up to 93 per cent protection, at the lower Kontol ratio of 1 part per 5,500.

Photographs of the interior surface of pup joints before and after protection with Kontol 116 are presented in Fig. 5. These two sets of pup joints with their respective couplings were both located 30 ft. above the pump for a 12-week test period.

Effect of treatment on the pulling history.—The effect of treatment for corrosion upon the frequency of well

(Continued on page 113)

TABLE 5—SUBSURFACE EQUIPMENT TEST RESULTS, WELL 5

	Weight loss of subsurface equipment, grams		
	4-15-47-7-9-47 Blank	7-10-47-10-6-47 Kontol 116	2-18-48 5-11-48 Kontol 118
Pos. in well—	0	1/2,500	1/5,500
Jt. 30 ft. above pump	175	55	12
Jt. 975 ft. above pump	138	19	22
Rod 25 ft. above pump	23	2	3
Rod 975 ft. above pump	22	3	4
Bottom coupling	24	5	1
Coupling 975 ft. above pump	10	4	1

TABLE 6—PULLING HISTORY DUE TO CORROSION BEFORE AND AFTER TREATMENT

Pulling frequency before treatment:	1	2	3	4	5	6
Production period, days	459	426	389	202	*91	360
No. of pullings required	†10	†10	†6	9	*7	22
Av. days between pullings	†46	†43	†65	22	13	16
Tubing joints replaced	All	48	46	All	9	16
Rods replaced	All	2	15	35	All	All
Pulling frequency during treatment with Kontol 116:						
Treating period, days	‡349	0	0	0	89	0
No. of pullings required	2	..	..	..	0	..
Average running time	174	..	..	..	(?)	..
Cause of pulling	Pump	..	..	..	..	..
Pulling frequency during treatment with Kontol 118:						
Treating period, days	173	264	267	282	95	241
No. of pullings required	1	2	1	3	1	0
Average running time	173	132	267	94	95	(?)
Cause of pulling	Pump	Pump	Pump	Pump	Pump	..

*A new rod string was run in 3 months before start of treatment. Badly worn and poorly adjusted surface equipment caused 20 rod breaks a month with the old string, and 16 rod breaks in addition to the 7 recorded pullings since the new string was run in. †An incomplete record of pullings was kept for the year prior to treatment. A closer estimate of the number of pullings actually experienced by these wells could be double the recorded number. ‡The well was undergoing treatment for only 167 of these days, after which followed a period of 182 days of no treatment.

TABLE 4—SUBSURFACE EQUIPMENT TEST RESULTS, WELL 2

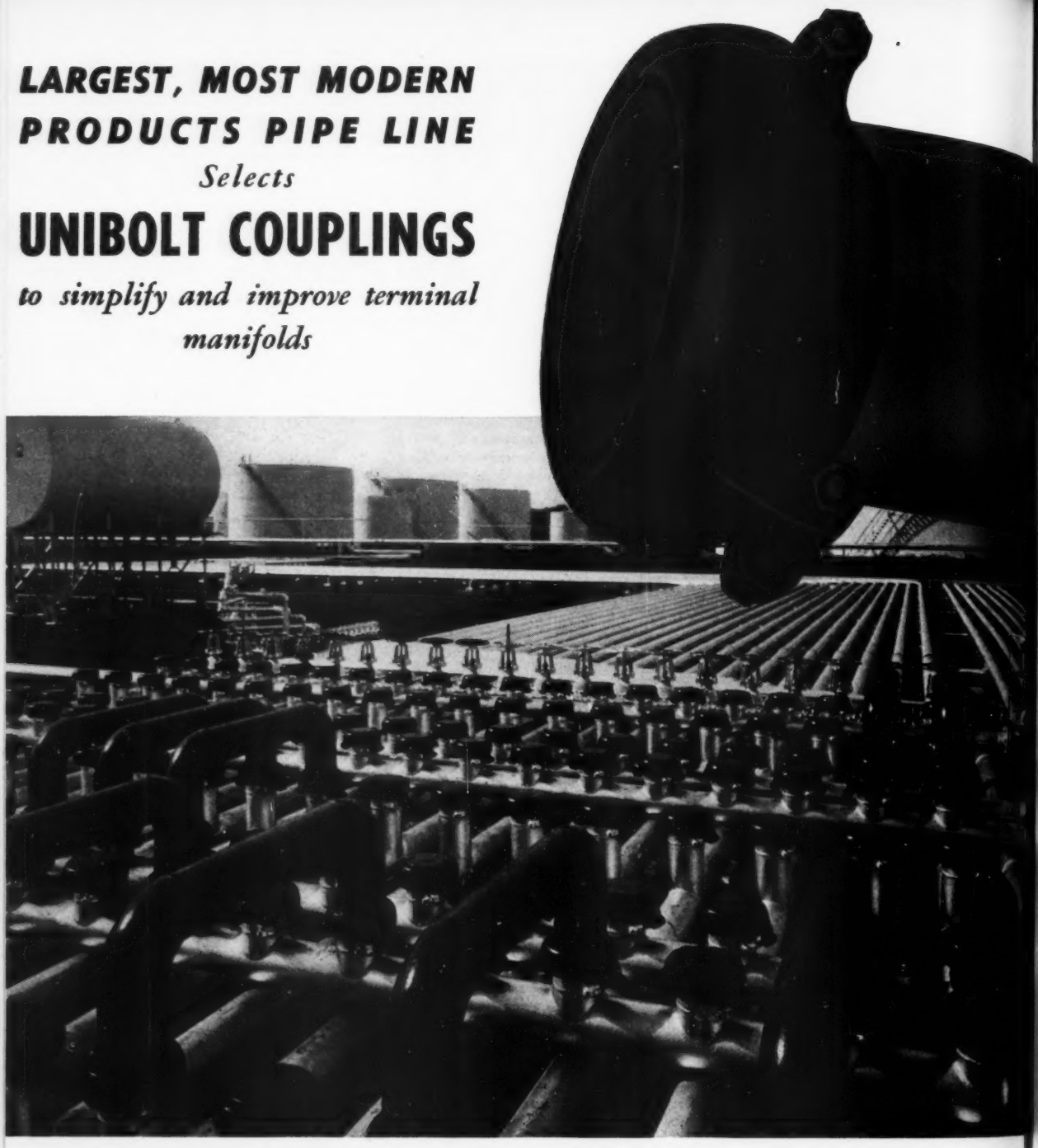
	—Wt. loss of subsurface equipment, grams—			
	9-12-46-11/19/46 Blank (68 days)	Extrapolated Blank to (85 days)	5-28-47-8-27-47 Kontol 118 1/4,400	11-27-47-2-19-48 Kontol 118 1/4,870
Position in well—				
Jt. 30 ft. above pump	158	197	117	17
Jt. 300 ft. above pump	186	232	127	15
Jt. 100 ft. below surface	57	71	62	25
Rod 25 ft. above pump	26	32	70	0
Rod 300 ft. above pump	..	..	168	0
Rod 100 ft. below surface	13	16	15	1
Bottom coupling	..	..	18	3
300 ft. coupling	..	..	20	
Top coupling	..	..	10	5

LARGEST, MOST MODERN PRODUCTS PIPE LINE

Selects

UNIBOLT COUPLINGS

to simplify and improve terminal manifolds



Pictured above is one of several new loading manifolds on a recently expanded and modernized pipe line products system which presents a radical departure from conventional manifolding. Its unusual design has resulted in much favorable comment due to the fact that it assures positive segregation of products and provides maximum flexibility in the handling of tankage.

Note that this manifold makes use of Unibolt Couplings with blanking plugs instead of control valves on the products lines. The cross-overs are equipped with a half-coupling on each end and may be easily fitted to any mating half-coupling on any line. Tightening only two bolts effects a pressure-tight joint. Thus the chance of commingling of products that comes with valves, due to mechanical defects or failure to close the valve gate completely, is entirely eliminated.

If and when you set out to expand or modernize your products pipe line system, a Unibolt engineer will gladly consult with you on how Unibolt Couplings can improve the efficiency of your terminal manifolds.

UNIBOLT Couplings are also widely used for scraper traps, gathering lines, gas line blow-downs, and strainer closures, and have numerous applications in drilling and producing hook-ups. See your Composite Catalog or write direct for literature.

UNIBOLT
THE ONE BOLT COUPLING

UNIBOLT

PIPE LINE COUPLINGS

Manufactured by

THORNHILL-CRAVER COMPANY

HOUSTON, TEXAS

Texas Natural Gas

Moving into pipe lines at rate of nearly 4 billion cubic feet per day

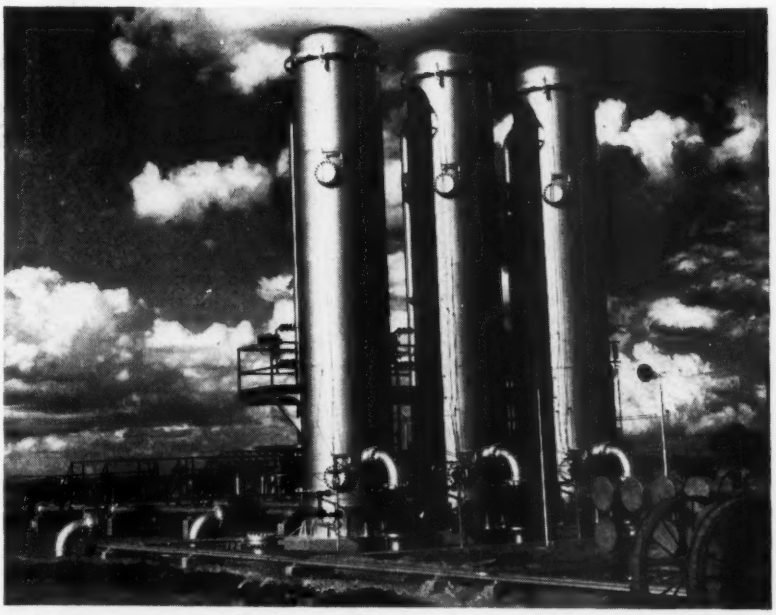
by Dahl M. Duff

TRANSMISSION pipe lines are taking approximately 22 per cent more natural gas in Texas than they did a year ago and at a substantially higher price, thus adding to their importance as a principal factor in the conservation of this once widely wasted resource.

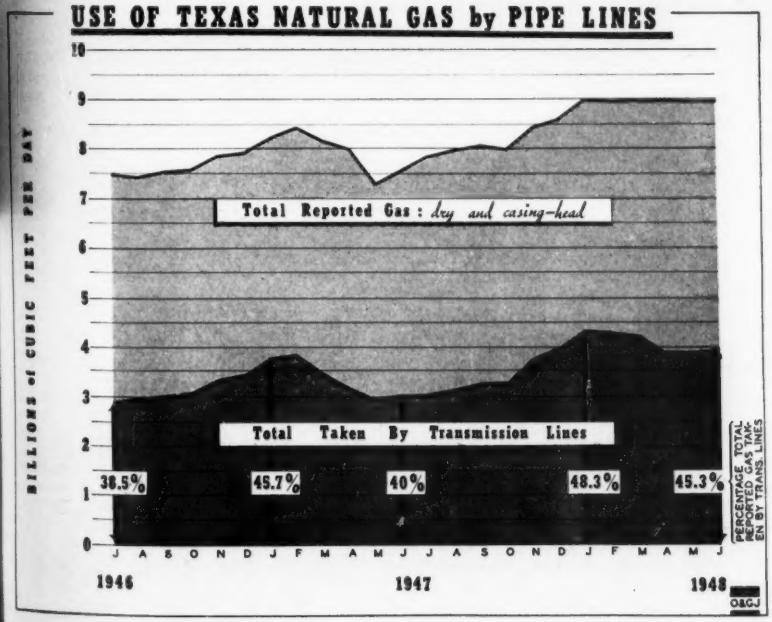
More than 3,900,000,000 cu. ft. of an estimated 10,000,000,000 cu. ft. daily total Texas gas production is finding a market with the transmission pipe lines, including the large-diameter interstate lines which now extend virtually to both the East and West Coasts.

This increasing volume of gas flowing into transmission pipe lines has been made possible by the tremendous construction program which has been under way in the natural-gas industry since the end of the war. It is a result of a record-heavy demand and a recognition that gas is a preferable fuel for most uses.

Field prices for natural gas have been moving sharply upward since the war. Pipe lines and other purchasers of sweet natural gas in Texas last year paid an average of 5.22 cents per 1,000 cu. ft., a 16 per cent increase over the preceding year.



Tennessee Gas Transmission Co.'s diethylene glycol contactors at Agua Dulce



The heavy demand for gas and the upward trend of prices, which have caused sharp competition for gas supplies in some sections of the state, have provided a highly favorable background for the gas-conservation efforts of state authorities and the industries. Every rise in demand and price provides a further incentive for conservation under its definition as beneficial use without avoidable physical waste.

Transmission lines not yet completed or still in the planning stage assure further enlargement of this major market for Texas gas over the next several years. Capacities of lines announced and approved but not yet finished indicate that the flow of Texas gas into transmission lines will be well above 5,000,000,000 cu. ft. daily by the end of 1950.

The general trend of the line representing total transmission-line take

of Texas natural gas is upward, although it shows normal seasonal fluctuations. (See accompanying chart.) Comparing the same months, the total taken by transmission lines in June 1948 was 3,933,000,000 cu. ft. daily against 3,060,000,000 cu. ft. daily in May 1947. The winter peak was 4,335,000,000 cu. ft. daily in January.

Data derived from Railroad Commission reports also show that the average volume of Texas natural gas taken by pipe lines for the first 6 months of 1948 was 4,109,000,000 cu. ft. daily against 3,354,000,000 cu. ft. daily in the same period of 1947, an increase of approximately 22 per cent.

In June of this year, pipe lines took 45.31 per cent of all reported Texas gas. In January this percentage was 48.29 with heavy cold-weather withdrawals. Other major users of gas were: cycling which in June took 18.85 per cent; and carbon-black manufacture which in June took 11.89 per cent. Extraction loss in plants and lease and plant fuel accounted for about 12 per cent. These figures refer to what the Railroad Commission calls ultimate gas disposition and hence do not include usual gasoline-plant intake.

Total gas disposal reported to the commission in June 1948 averaged 8,679,000,000 cu. ft. daily. Actual gas production in the state is estimated at about 10,000,000,000 cu. ft. daily. The difference is unreported flared field gas, and total gas production is arrived at by using the accepted 1,350 cu. ft. per barrel as the average gas-oil ratio in Texas to determine total casing-head output.

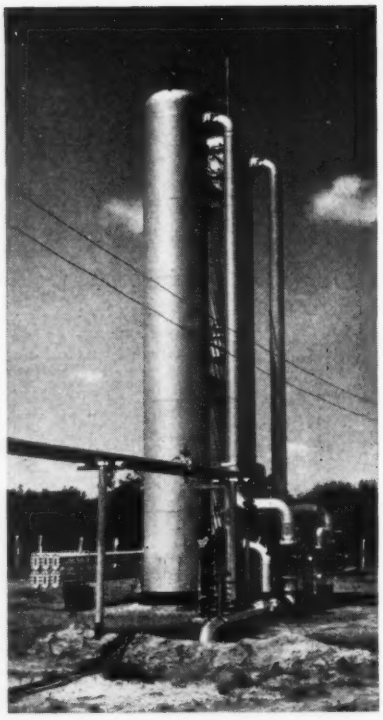
Major Supply Sources

The major sources of supply for gas-transmission pipe lines are gasoline-plant residue, dry field gas, and field casing-head. The reports show that an increasing amount of the gas supplied to transmission lines is coming from gasoline-plant residue.

Gasoline plants furnished pipe lines with 2,189,740,000 cu. ft. daily in June 1948 compared to 1,791,000,000 cu. ft. daily in the same month in 1947. The percentage of total gasoline-plant residue taken by transmission lines rose from 43 per cent in June 1947 to 51 per cent a year later.

From a geographical standpoint, the major change in gas supply in the last few years has been the greater importance of various Gulf Coast areas and Carthage field in East Texas as sources for transmission lines. Dry-gas withdrawals by pipe lines from Railroad Commission Districts 5 and 6, including Carthage, rose 45 per cent from May 1947 to May 1948. A 32 per cent increase from May 1947 to May 1948 was shown in the dry-gas take by transmission lines from District 3 on the Upper Gulf Coast.

Average prices paid for sweet, sour, and casing-head gas per 1,000 cu. ft. in Texas in 1945, 1946, and 1947, are set out in the accompanying table. This tabulation is from reports of George H. Sheppard, Texas state comptroller, showing collections from Texas' 5.2 per cent ad valorem tax on gas production.



T.G.T.'s dehydration plant at San Salvador field near Edinburgh, Tex. This plant is treating about 35,000,000 cu. ft. daily

The 5.22-cent per 1,000 cu. ft. average price received by producers of dry gas in 1947 represents an increase of about 16 per cent over 1946 and an increase of about 26 per cent over 1945. As for casing-head, average price showed a sharp rise of about 65 per cent to 3.13 cents in 1947 from the average in 1946. Improved methods of desulfurization contributed to the rise in the price paid for sour gas.

Reasons for Increases

Further increases in gas prices have been apparent during the current year. Contracts being written are mostly in the 6 to 10-cent range and in some cases even higher.

A chemical-industry publication has commented that skyrocketing gas prices explained in part the reluctance of the chemical industry to erect additional capacity in the Southwest for the manufacture of synthetic alcohol, which is based on low-cost ethylene from natural gas. It pointed out that chemical and carbon-black interests as well as the projected synthetic-fuel and chemical plants employing the Fischer-Tropsch modifications find themselves competing at a disadvantage with pipe-line companies supplying natural gas for fuel and lighting.

Regardless of the position of the chemical industry, it is apparent that there is a vigorous search for suitable gas sources. Texas has nearly 55 per cent of the nation's 165,926,000,000,000 cu. ft. reasonable gas reserve. But like crude oil, heavy demand has brought about a tight market for accessible sources of dry gas in some areas, particularly along the Gulf Coast.

Some major oil companies are holding their gas reserves, or at least have no particular desire to contract for their sale, until the possibilities of synthetic liquid-hydrocarbon production are better known. Many larger fields already are dedicated as a long-range supply for an existing transmission line or some other user. The trend toward cycling also has withdrawn considerable gas.

TREND OF AVERAGE GAS PRICES IN TEXAS

(Cents per 1,000 cu. ft.)

Sweet Gas

Dist.	Average price 1945	1946	1947	Volume, 1947 (M.c.f.)
1	3.30	3.47	3.15	1,562,871
2	3.17	3.46	4.08	116,816,107
3	5.49	6.48	8.26	214,652,188
4	5.55	6.20	6.91	185,085,847
5	7.87	9.57	10.93	19,468,032
6	4.13	4.12	5.21	247,777,166
7	4.91	4.87	4.97	17,463,250
8	3.71	3.64	4.29	3,597,221
9	3.85	4.01	3.97	5,052,125
10	2.95	3.09	3.46	552,577,965
State	4.14	4.48	5.22	1,334,484,681

Sour Gas

Dist.	Average price 1945	1946	1947	Volume, 1947 (M.c.f.)
1	4.57	4.47	4.47	1,077,052
2	0	0	3.02	101,948
3	0	0	0	0
4	0	0.70	3.00	6,813
5	0	0	0	0
6	0	0	0	0
7	0	0	3.50	1,209
8	3.06	3.00	2.70	4,441,480
9	0	0	0	0
10	3.17	1.83	3.08	252,403,918
State	1.41	1.86	3.08	258,032,420

Casing-Head Gas

Dist.	Average price 1945	1946	1947	Volume, 1947 (M.c.f.)
1	2.78	3.96	3.88	897,027
2	1.34	1.38	1.78	19,992,134
3	1.48	1.16	1.73	219,771,987
4	1.27	1.44	2.11	55,743,756
5	4.76	4.59	5.66	11,099,825
6	4.40	3.92	7.30	79,779,168
7	3.45	3.14	4.79	24,028,226
8	1.25	1.43	2.41	160,845,273
9	2.44	2.39	4.68	31,327,861
10	2.11	2.41	4.03	62,016,034
State	2.01	1.90	3.13	665,501,411

NO JOB TOO TOUGH

Oil field hauling proves the worth of International "Westerns."

These giant trucks are built at International's Emeryville, Calif., Works, of components that can "take it."

These components are coordinated by International into a rugged truck that does mighty work.

International "Westerns" are built in six models. Two for highway service have gross weight ratings of 30,000 and 40,000 pounds. Off-highway models have gross weight ratings of 40,000 to 90,000 pounds.

Gasoline, diesel and butane engines are available; and transmissions and axles for every requirement.

Motor Truck Division
INTERNATIONAL HARVESTER COMPANY · Chicago

Tune in James Melton on "Harvest of Stars." CBS Wednesday Evenings.

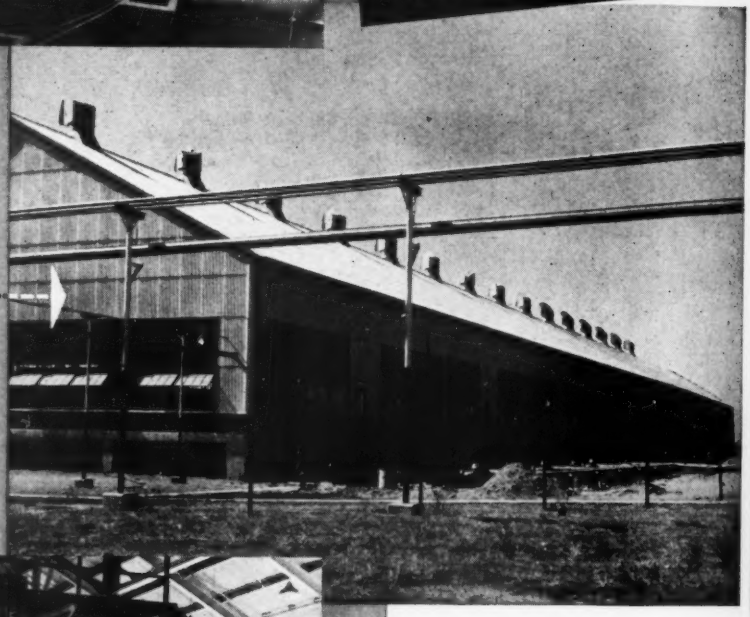
THIS EMBLEM IDENTIFIES GREAT TRUCKS
INTERNATIONAL

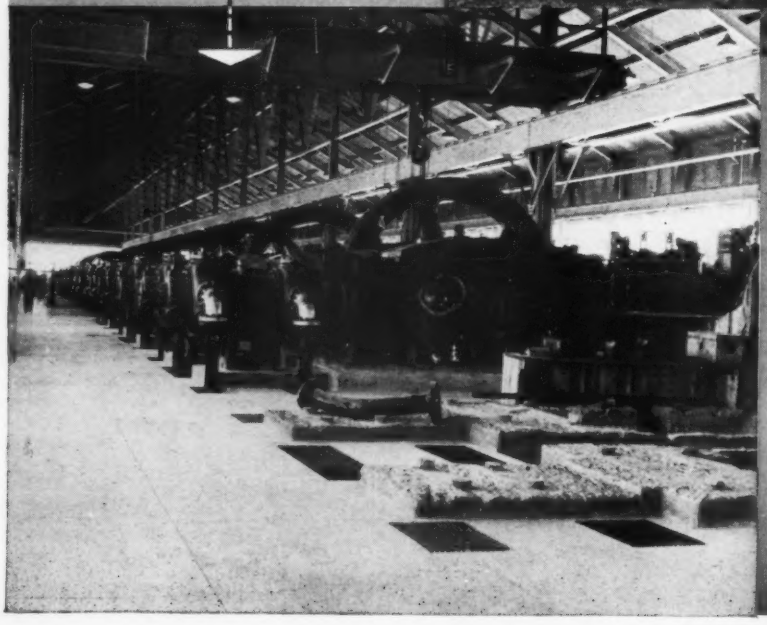
INTERNATIONAL *Trucks*

Leading

WORTHINGTON HORIZONTAL GAS ENGINE COMPRESSORS WILL TOTAL 135,200 ICHP

Photos taken at one of the country's largest compressor stations — the Stinnett, Texas, plant of the Texoma Natural Gas Company, a company affiliated with the Natural Gas Pipeline Co. of America. Interior views show Worthington Horizontal Gas Engine Compressors (24" x 36", Twin Tandem, 1400 HP each) in process of installation. Starting with 57 of these in 1931, the company will have 104 Worthington units of various types by 1949—for a total of 135,200 ICHP!





Worthington "Angles"

Throughout the oil and gas industries Worthington LTC Angle Gas Engine Compressors are famous for cost-saving, uninterrupted gas-transmission. In refrigeration, and in chemical and other processes as well, this ability of LTC's to carry full loads "around the clock" is proving to a wide range of users that *there's more worth in Worthington* . . . Five sizes of cylinder combinations, 400 to 1000 HP. Write for Bulletin L-690-B1.

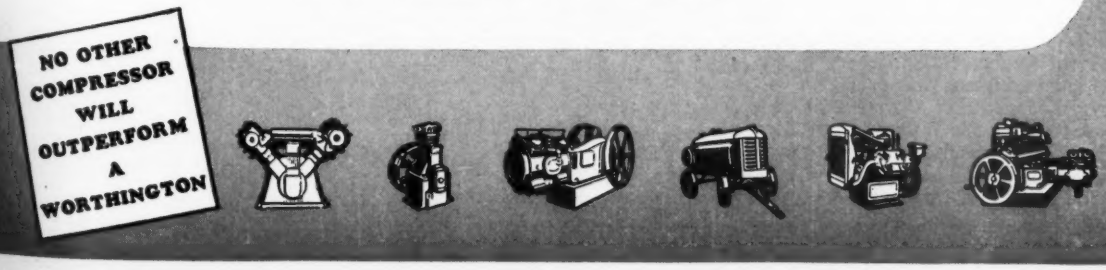
pipeline company adds **ANOTHER** *Worthington mass-installation!*

The Natural Gas Pipeline Company of America, since its formation in 1931, has made Worthington units key factors in an outstanding expansion program. By 1949, this will include a line-capacity of 484 million cu. ft. per day—almost triple the original volume!

Case histories like this—and Worthington can show you plenty of them—point to facts vital to every user of power or compressor service. Such reorders for multiple installations can only come from complete confidence—based on years of "living with" Worthington equipment, checking continuously on its dependability and economy, comparing it with competitive units.

That's why it will pay you—whether you need one engine or a battery of them—to look further into the many advantages of Worthington Horizontal Gas Engine Compressors. Write for information. *Worthington Pump and Machinery Corporation, Engine Division, Buffalo, New York.*

WORTHINGTON



Catalytic Treatment of Synthetic Gasoline

by C. J. Helmers,* A. Clark,* and R. C. Alden*

DURING the past few years the widespread publicity given to the projected shortages of petroleum products, together with the possibility of future shortages of domestic crude oil, have directed considerable attention toward synthetic fuels. The petroleum industry for the past decade has been making synthetic fuel components from refinery byproducts, but more recently research activity has been directed towards the synthesis of motor fuels from raw materials other than crude oil. The modified Fischer-Tropsch syntheses have received a great deal of attention, both in the laboratories of private industries and in government-sponsored research programs because such processes can be employed to manufacture hydrocarbons synthetically either from natural gas or from solid carbonaceous fuels.

Depending upon the type of catalyst utilized and the operating conditions employed, the synthetic motor fuel produced can be varied from a highly paraffinic to a predominantly olefinic-type gasoline. These raw synthetic gasolines have inferior octane ratings when compared with the motor fuel produced currently by cracking petroleum. In view of the trend towards higher octane number, higher sensitivity, and higher-compression engines the quality of these synthetic gasolines becomes an important factor.

The gasoline synthesized from carbon monoxide and hydrogen in the presence of an iron-base catalyst differs from that produced from crude petroleum as to type of nonhydrocarbon impurities present. The chief impurities found in cracked gasoline are sulfur and, to a lesser extent, nitrogen compounds. In the synthesized gasoline the concentration of sulfur and nitrogen compounds is negligible but oxygen-containing compounds are present in much higher proportions than in any gasoline produced from crude oil.

One method of improving the quality of any motor fuel is that of removing these components or impurities which contribute to low octane ratings. Another method of upgrading motor fuel is that of changing the structure or type of hydrocarbon present. In the case of paraffinic stock this change in structure is usually effected by thermal or catalytic reforming and for the low-molecular-weight hydrocarbons isomerization is sometimes employed. The data presented below are concerned with the octane improvement of olefinic gasoline produced by hydrogenation of carbon monoxide, utilizing a fluidized iron-base catalyst.

*Phillips Petroleum Co., Research Department, Bartlesville, Okla.

Oxygenated Compounds Present

In the course of the synthesis of higher-molecular-weight compounds by the catalytic reaction of hydrogen and carbon monoxide a large proportion of the oxygenated compounds are recovered in the water layer condensed along with the hydrocarbons. A smaller proportion of these oxygenated compounds is found in the synthetic naphtha boiling in the normal motor-fuel range. These latter compounds, comprising a mixture of alcohols, aldehydes, ketones, esters, and acids, are valuable chemicals and may be recovered for their byproduct value. In any event the oxygenated compounds, having properties undesirable in a motor fuel, must be removed from the synthetic naphtha.

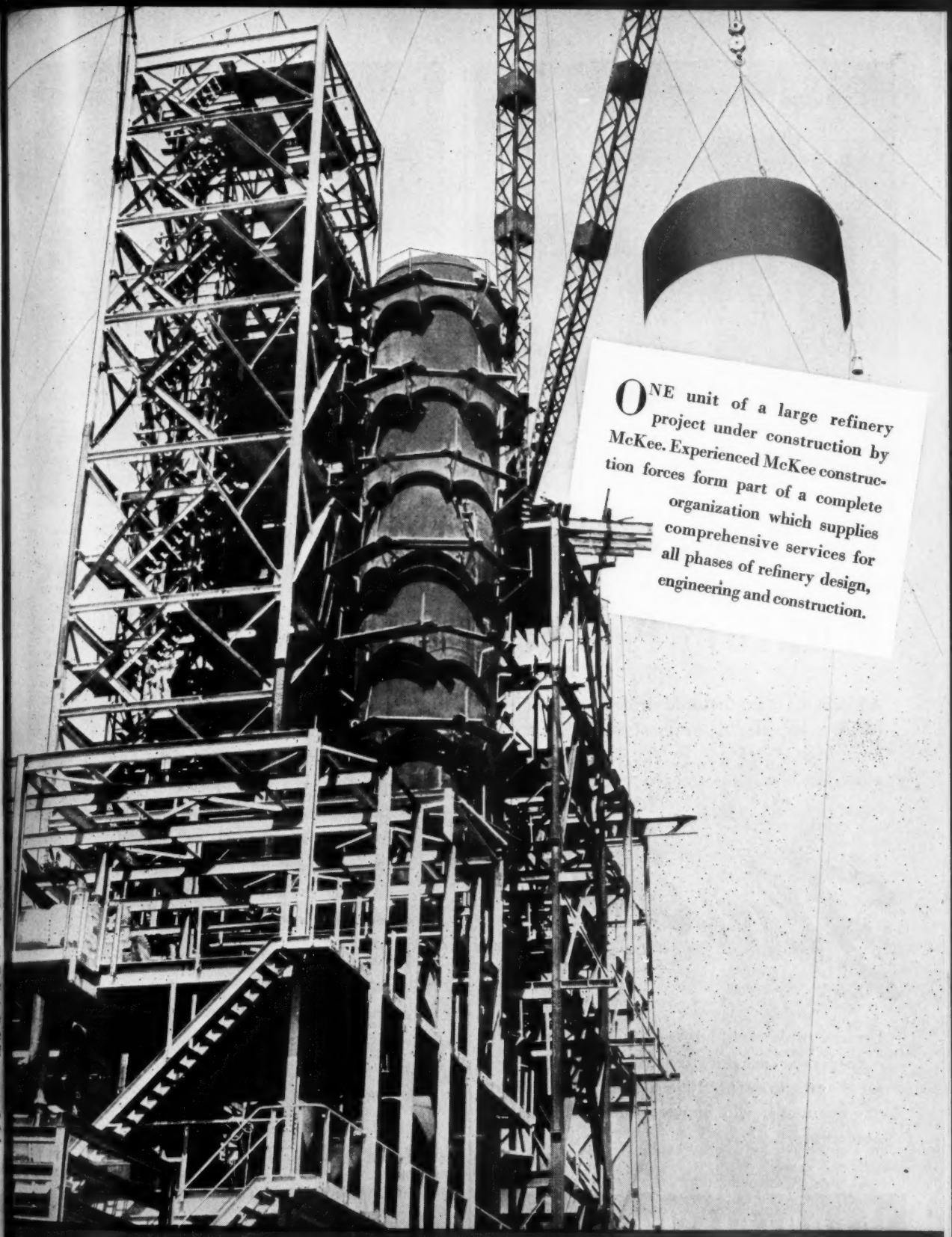
The oxygenated compounds contribute to poor odor, color, and gum-stability characteristics. From a comparison of the octane number of 400° F. end-point gasoline, before and after removal of oxygenates, it appears that the octane rating of these oxygen-containing materials is of the order of 50 to 55 motor octane numbers. Since they are present in minor concentrations, their removal will not materially improve the octane rating of the naphtha. Any major improvement in octane rating of the synthetic gasoline therefore requires improvement in the rating of the hydrocarbons present. In the case of olefins this can be most readily accomplished by isomerization. Published data on the ratings of a few olefins are shown in Table 1.[1] From this table it is noted that shifting of the double bond from the terminal carbon or 1-olefin position towards the center of the molecule markedly increases both the motor and research rating. An even greater improvement is attained if the straight-chain olefin is converted to a branched-chain olefinic hydrocarbon.

The isomerization of olefins is by no means a new idea and various patents have been issued on processes for isomerizing olefinic compounds. The Germans recognized the need of improving the octane rating of synthetic gasoline produced by the Fischer-Tropsch reaction and reported a retreating process under development early in the last war.[2] In this process the olefinic gasoline was passed through a two-stage catalytic treatment in which different temperature levels were employed. Among some of the recent publications on the isomerization of olefins and olefinic gasoline are those by Montgomery and coworkers.[3,4]

In the development of the Perco catalytic desulfurization process it was early realized that the octane improvements effected by this method of treating low-sulfur cracked gasoline, as well as a part in the octane improvement obtained in the treatment of high-sulfur cracked gasoline, could be explained only on the basis of isomerization of some of the olefins present. The application of

TABLE 1—OCTANE RATING OF ISOMERIC OLEFINS

Hydrocarbon—	Octane rating—Research 0 ml. TEL	Research 3 ml. TEL	Motor 0 ml. TEL	Motor 3 ml. TEL
Hexenes:				
C=C—C—C—C—C	76.4	91.7	63.4	76.3
C—C=C—C—C—C	92.7	98.4	80.8	83.2
C—C—C=C—C—C	94.0	...	80.1	82.3
C—C=C—C—C (C branch)	97.8	99.5	83.0	85.0
C—C=C—C—C (C branch)	99.3	...	84.3	...
Octenes:				
C=C—C—C—C—C—C—C	28.7	63.5	34.7	57.7
C—C=C—C—C—C—C—C	56.3	78.7	56.5	73.0
C—C—C=C—C—C—C—C	73.3	91.8	74.3	84.2



ONE unit of a large refinery project under construction by McKee. Experienced McKee construction forces form part of a complete organization which supplies comprehensive services for all phases of refinery design, engineering and construction.

McKEE

ARTHUR G. McKEE & COMPANY

Engineers and Contractors • Established 1905

2300 Chester Avenue • Cleveland, Ohio

30 Rockefeller Plaza • New York, N. Y.

DESIGN, ENGINEERING AND CONSTRUCTION FOR THE PETROLEUM REFINING AND IRON AND STEEL INDUSTRIES

UNDIVIDED RESPONSIBILITY IN ONE ORGANIZATION

Crossville, Ill., plant of the Warren Petroleum Corporation. In the dehydration towers, the drying agent is Florite Desiccant.

The Desiccant Used IS A FLORIDIN Product

Adsorbents manufactured either from Bauxite or from superior deposits of Fuller's Earth have been developed by the Floridin Company for highly specialized industrial uses.

Floridin ADSORBENTS

On any problem of adsorption—dehydration—catalysis—decoloration, the Floridin technical staff, drawing upon almost forty years of experience, will gladly give attention to your inquiry.

FLORIDIN COMPANY

Adsorbents . . . Desiccants . . . Diluents

Dept. C, 220 Liberty St., Warren, Pa.

YOU'LL FIND MAXIM SILENCERS

This photograph shows 15 steam jet Air Ejectors equipped with Maxim Silencers, some of the larger ejectors handling up to 9000 lbs. per hour of non-condensible gases at 8" Hg Abs.

The reason why you find Maxim Silencers so frequently in these more complicated installations is the same reason why you find Maxims in such a large percentage of all silencer installations . . . the reason is experience, more practical experience more research and development experience. Silencing has been our business for years.

If you need silencing for internal combustion engine exhaust or intake . . . compressor intake . . . vacuum pump discharge . . . steam blow-off . . . spark arrestor silencers . . . or heat recovery silencers, consult Maxim.

BULLETINS ON REQUEST

THE MAXIM SILENCER COMPANY

98 HOMESTEAD AVE. HARTFORD 1, CONNECTICUT

BE SURE IT'S A MAXIM

this proven commercial process to upgrading olefinic synthetic gasolines was investigated in bench scale and pilot-plant tests.

The Perco catalytic desulfurization process has been described elsewhere.[5,6] In brief it entails a mild vapor-phase treatment of the gasoline over bauxite catalyst. The gasoline is vaporized and preheated to 700°-800° F. and the superheated vapors are passed through the catalyst bed at a pressure of 30-50 lb. Treating rate is of the order of 1 to 3 volumes of gasoline per hour per volume of catalyst or approximately 150 to 450 bbl. of gasoline per ton of catalyst per day. Since these treating conditions are relatively mild a high product yield is obtained.

Experimental Procedure

The synthetic gasoline was produced in the experimental pilot plant of Phillips Petroleum Co., utilizing a fluidized iron catalyst to synthesize the gasoline from carbon monoxide and hydrogen. The sample used for the retreatment study was taken after the fourth week of continuous operation and was considered representative of steady operation with the particular catalyst and operating conditions employed.

The raw synthetic effluent, after separation from the condensed water, was debutanized and cut to end point prior to retreatment in the Perco desulfurization pilot plant. The inspection tests of this 5-lb. R.v.p. gasoline are included in Table 2. Following the low-temperature treatment over bauxite catalyst, the gasoline was again debutanized to remove any dissolved light hydrocarbons produced in the treating step. The treated product was also rerun to end point to remove the trace of olefinic polymers boiling above the original gasoline end point.

Octane ratings of treated products shown below are those obtained on a 5-lb. R.v.p. stock and do not include the poly gasoline available from catalytic polymerization of C_3 and C_4 olefins produced in the synthesis step. By the addition of the cat poly gasoline and sufficient butane to raise the vapor pressure to the normal motor fuel level the rating of the finished gasoline will be further increased to approximately 80 motor and 90 research octane numbers.

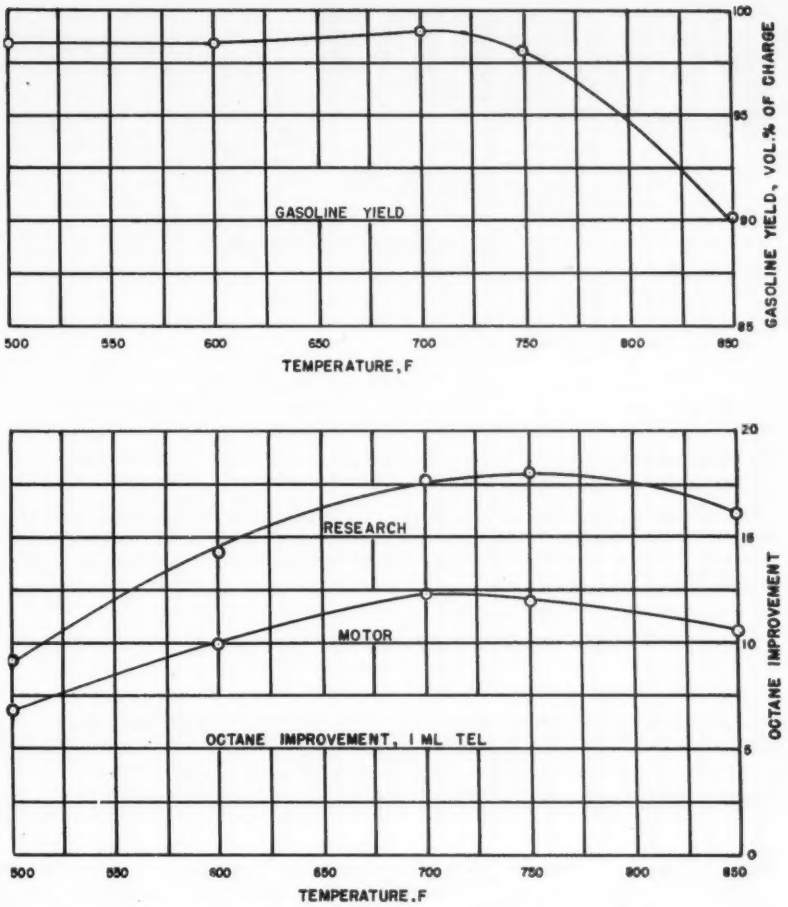


Fig. 1—Effect of temperature of Perco treatment (1.5 V/V/H)

Effect of Temperature and Flow Rate

The tests reported in Table 2 were all made at arbitrarily selected conditions to permit direct comparison of the effect of temperature of catalytic treatment. In each test the catalyst chamber pressure was maintained at 40 psig. and the raw synthetic gasoline was charged to the catalyst at the rate of 1.5 volumes of gasoline per volume of catalyst per hour or the equivalent of about 210 bbl. of gasoline per ton of catalyst per day. Regenerated bauxite was employed as the catalyst throughout the study.

As can be seen from Table 2 and Fig. 1 the octane-number improvement reached a maximum in the temperature range of 700°-750° F. at the charge rate employed in this series of tests. In this temperature range the octane rating of the debutanized naphtha (1 ml. TEL) is 79-80 motor and 90 research octane numbers. At this TEL level the Perco treatment effected an improvement of 12-13 motor and approximately 18 research octane numbers. If the raw naphtha has a lower rating than that shown in Table 2 even greater improvement is obtained. The sensitivity or "jump" of this leaded gasoline was increased from 4.5 to 10-10.5 octane numbers as a result of the catalytic treatment.

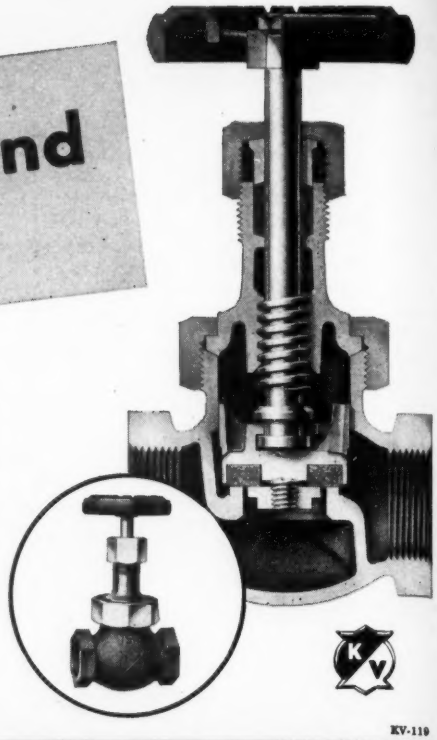
It will be noted from Table 2 that

TABLE 2—EFFECT OF TEMPERATURE IN PERCO TREATMENT

Temperature, °F.	Charge	500	600	700	750	800
Feed rate, V/V/H				1.5		
Product yield (based on charge):						
Gasoline, vol. %	....	98.5	98.5	99.0	98.2	90.1
C_4 and lighter, cu. ft./bbl.	....	None	None	26	30	251
Carbon, wt. %	....	0.43	0.55	0.62	0.75	1.24
Gasoline characteristics:						
Motor octane number:						
0 ml. TEL	60.1	66.8	70.4	73.5	73.7	71.7
1 ml. TEL	67.3	74.2	77.3	79.7	79.3	77.9
3 ml. TEL	74.6	78.8	80.3	81.9	82.2	81.4
Research octane number:						
0 ml. TEL	63.2	71.7	76.6	81.1	82.0	78.9
1 ml. TEL	71.9	81.2	86.2	89.7	90.0	88.0
3 ml. TEL	82.9	87.6	90.5	92.0	92.2	91.5
A.S.T.M. distillation, °F.:						
First drop	103	106	106	102	102	105
5 per cent	138	135	138	127	133	132
10 per cent	152	149	145	140	147	145
50 per cent	238	231	233	229	232	224
90 per cent	353	344	343	344	344	350
End point	396	390	390	385	383	384
Gravity, °A.P.I.	63.9	64.5	65.2	65.8	65.2	66.0
Bromine number	116	118	122	122	123	115

KENNEDY

Bronze Globe and Angle Valves



With bronze, renewable composition, regrinding, full-way or plug-type discs, in a full range of standard sizes. Types for pressures up to 300 lb. steam and 600 lb. water, oil or gas. Each design has several distinctive features which assure easy operation and lastingly trouble-free service.

The 240-page Catalog 63 describes in detail the entire Kennedy line of bronze and iron body gate, globe, angle and check valves for all standard requirements, malleable iron and bronze screwed fittings, and cast iron flanged fittings and flanges.

Buy from your local Distributor

THE KENNEDY VALVE MFG. CO.
Elmira, New York

KV-110

KENNEDY *valves - pipe fittings - fire hydrants*

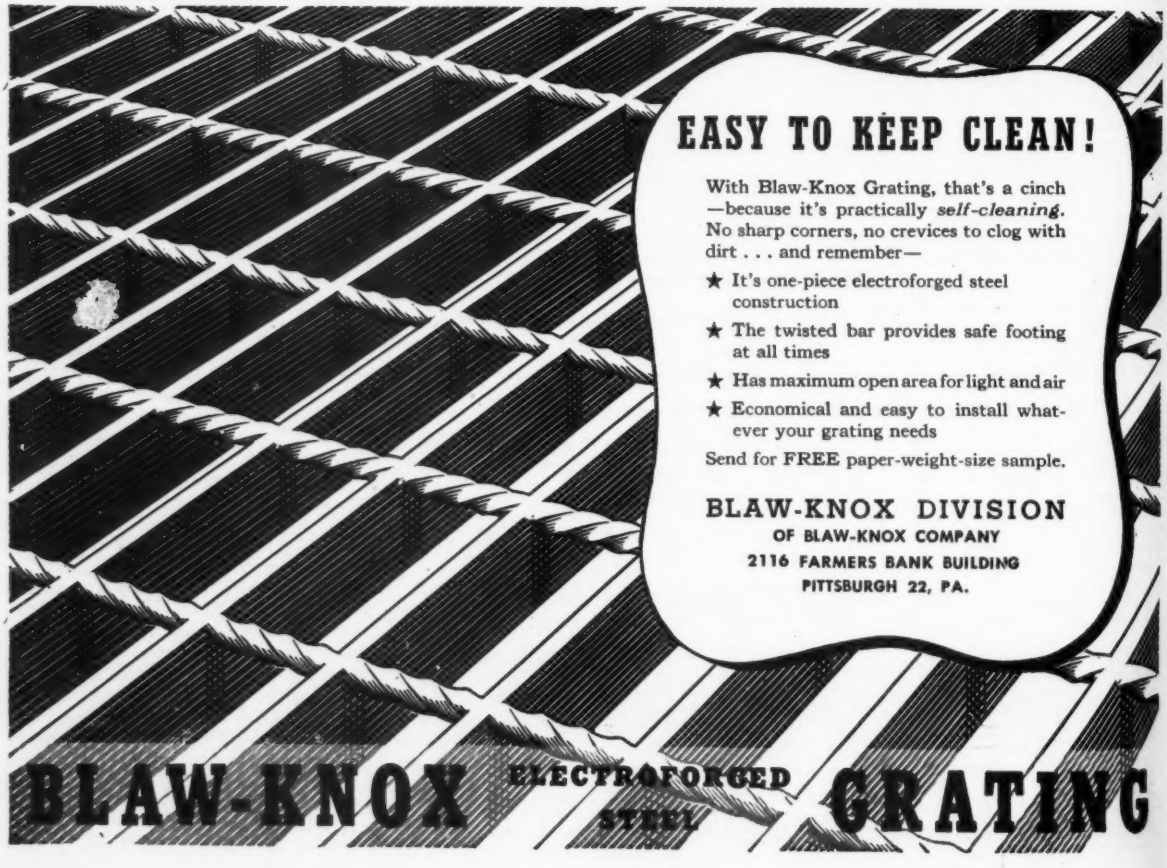

EASY TO KEEP CLEAN!
With Blaw-Knox Grating, that's a cinch —because it's practically self-cleaning. No sharp corners, no crevices to clog with dirt . . . and remember—
★ It's one-piece electroforged steel construction
★ The twisted bar provides safe footing at all times
★ Has maximum open area for light and air
★ Economical and easy to install whatever your grating needs
Send for FREE paper-weight-size sample.
BLAW-KNOX DIVISION
OF BLAW-KNOX COMPANY
2116 FARMERS BANK BUILDING
PITTSBURGH 22, PA.
BLAW-KNOX ELECTROFORGED STEEL GRATING

TABLE 3—EFFECT OF FLOW RATE IN PERCO TREATMENT

Temperature, °F.	750			850	
Flow rate, V/V/H	0.5	1.5	3.0	1.5	3.0
Product yield (based on charge):					
Gasoline, vol. %	95.8	98.2	99.4	90.1	94.0
C_4 and lighter, cu. ft./bbl.	55	20	13	251	106
Carbon, wt. %	1.57	0.75	0.36	1.24	0.53
Gasoline characteristics:					
Motor octane number:					
0 ml. TEL	75.2	73.7	70.8	71.7	74.3
1 ml. TEL	80.9	79.3	78.0	77.9	78.9
3 ml. TEL	83.0	82.2	81.4	81.4	82.5
Research octane number:					
0 ml. TEL	...	82.0	78.3	78.9	80.5
1 ml. TEL	...	90.0	86.9	88.0	90.0
3 ml. TEL	...	92.2	90.4	91.5	92.8
A.S.T.M. distillation, °F.:					
First drop	104	102	106	105	107
5 per cent	137	133	131	132	134
10 per cent	150	147	148	145	148
50 per cent	226	232	229	224	220
90 per cent	341	344	340	350	336
End point	394	383	384	384	394
Gravity, °A.P.I.	64.1	65.2	64.6	66.0	66.0
Bromine number	114	123	124	115	129

at this flow rate the yield of gasoline began to decrease at an appreciable rate as the treating temperature exceeded 750° F. Elevation of the temperature to 850° F. without change in flow rate effected no material improvement and in some cases even reduced the improvement in octane rating. Concurrently the yield of gasoline was reduced due to the fact that the more severe treating conditions induce undesirable side reactions which contribute to higher yields of polymer and light gas and increase the carbonaceous deposits on the catalyst. Coke formation, of course, affects catalyst activity. It should be kept in mind that apparent polymer formation is always higher when using small-scale equipment than is found in the case of large-scale or commercial operation.

Another series of tests were made at temperature levels of 750° F. and 850° F. while varying the naphtha feed rate, Table 3. In the three tests made at the 750° F. level it is noted that the highest octane improvement was obtained with the lowest flow rate. Offsetting this improvement, however, is the fact that gasoline yield was reduced while gas production and carbon deposition on the catalyst was considerably higher than at higher flow rates.

In the tests made at 850° F. the treating conditions were much more severe; increasing the flow rate from 1.5 to 3.0 volumes per hour tended to offset the extent of side reactions so that at the higher temperature level a higher feed rate can be utilized. Thus, increasing the treating temperature from 750° F. to 850° F. and doubling the flow rate gives essentially the same octane improvement though the high-temperature treatment still suffers a slight penalty by way of gasoline yield and gas formation.

Blending Octane Ratings and Gum Characteristics

Since it may be presumed that gasoline synthesized from either natural gas or coal will be utilized in conjunction with motor fuel produced in the conventional manner and certainly will be blended with polymer gasoline some information on blending octane numbers was considered of interest. Eighty volumes of debutanized synthetic naphtha which had been subjected to the Perco catalytic treatment were blended with 20 volumes of a commercial poly gasoline. The octane ratings of the treated naphtha are compared with the blending ratings in Table 4. These data show that the blending value is slightly better than the actual octane rating when considering unleaded fuel while the leaded naphtha shows no appreciable blending effect.

To ascertain the blending effect with a paraffinic stock portions of the treated and untreated debutanized synthetic naphtha were blended with 12-lb. natural gasoline in the ratio of 80 : 20 by volume. In Table 5 it is noted that the blending rating of the untreated naphtha is appreciated by 1 to 2 octane numbers when TEL is absent; with added TEL no appreciable blending effect was observed in the octane ratings. In the case of the Perco-treated synthetic gasoline the blending motor octane number was essentially the same as the actual rating while the blending research ratings exceeded the actual ratings by several octane numbers.

TABLE 4—BLENDING OCTANE NUMBER OF TREATED SYNTHETIC C_5-400° F. NAPHTHA

(Cat Poly Blend)

	Actual	Blending
Motor:		
0 ml. TEL	73.7	75.4
3 ml. TEL	79.3	79.2
Research:		
0 ml. TEL	82.0	83.1
3 ml. TEL	90.0	90.1

TABLE 5—BLENDING OCTANE NUMBER OF SYNTHETIC $C_5$400° F. NAPHTHA

(Natural gasoline blend)

	Untreated naphtha		Perco treated naphtha	
	Actual	Blending	Actual	Blending
Motor:				
0 ml. TEL	60.1	62.1	73.7	72.7
1 ml. TEL	67.3	67.7	79.3	79.1
Research:				
0 ml. TEL	63.2	64.2	82.0	84.1
1 ml. TEL	71.9	72.4	90.0	92.1

Another motor-fuel property of interest to any refiner is that of gum content and storage stability. A.S.T.M. and copper-dish gums as well as induction period of raw and Perco-treated naphtha were determined to observe the effect of the treatment upon gum characteristics. In addition to markedly improving the odor and color of the gasoline it is seen in Table 4 that the bauxite treatment has reduced the A.S.T.M. gum content from 3 to 0 mg. In the course of this catalytic treatment those oxygenated compounds which act as natural inhibitors are removed. As a result the copper-dish gum does not show the same improvement as the A.S.T.M. gum, and the induction period was markedly reduced on the uninhibited treated samples. When inhibited with a commercial antioxidant (5 lb. per 1,000 bbl. of gasoline) it was found that in addition to improvement in octane rating, color, and odor, the vapor-phase treatment improved the copper-dish as well as the A.S.T.M. gum and produced a gasoline having an excellent induction period for a highly olefinic gasoline.

Change in Composition of Gasoline

The refiner is primarily interested in improvement of octane number and storage characteristics of gasoline; nevertheless, it is of interest to examine the results of these tests in the light of changes which the treatment produces in the composition of the gasoline. On the basis of combustion analyses, silica-gel percolations, acid number, and hydroxyl number determinations, it is apparent that the oxygenated compounds are decomposed in passing through the catalyst bed. This is borne out by the fact that the off gas from the Perco unit contained oxygen, carbon

TABLE 6—EFFECT OF PERCO TREATMENT ON GUM AND STORAGE STABILITY OF SYNTHETIC NAPHTHA

Treatment—A. After 2-day storage—	Uninhibited		Inhibited	
	None	Perco	None	Perco
A.S.T.M. gum, mg.	3.3	0.0	4.1	0.0
Copper-dish gum, mg.	26	31	8	0.6
Induction period, minutes	180	30	400	480
Color, Saybolt	+13	+30		
B. After 3-week storage—				
A.S.T.M. gum, mg.	4.5	4.9	5.1	1.3
Copper-dish gum, mg.	25	77	27	0
Induction period, minutes	180	30	300	465
Color, Saybolt	+6	+30		

Why pull the well so often?

Use the ORIGINAL composition valve cups, seating cups and rings

DARCOVA

YOU'LL SAVE MONEY BECAUSE..

• Precise control of all materials and processes from lab to well means exceptional resistance to wear and deterioration . . . fewer pulling jobs! • Different textures, scientifically developed, fully proved, give peak efficiency and longer flex-life at any depth! • Precisely controlled sizes for any make or size pump . . . no misfit inefficiency! • Ask for genuine Darcovas at your supply store.

DARLING VALVE & MANUFACTURING COMPANY

DARCOVA

THE ORIGINAL COMPOSITION CUP

WILLIAMSPORT 1, PA.

dioxide, and carbon monoxide. In the catalytic desulfurization of conventional gasoline, gas production is negligible and normally consists only of hydrogen sulfide and small quantities of low-boiling olefins produced through the decomposition of the organic sulfur compounds. By contrast, the gas produced in treating these synthetic naphthas is relatively high in hydrogen, methane, C_3's and C_4's. At treating temperatures of 700°-750° F. the mol ratio of hydrogen to methane is of the order of 2 to 1 and the C_3 and C_4 hydrocarbons are predominantly olefinic. This unusual distribution of components in the gas produced from this low-temperature treatment indicates that the probable mechanism of the decomposition of the oxy-compounds is essentially a splitting off of carbon monoxide or carbon dioxide from the acids, ketones, and aldehydes and dehydration of the alcohols present in the gasoline boiling range. Upon increasing the temperature level the hydrogen-methane ratio is markedly increased while the proportion of olefin in the C_2, C_3, and C_4 cuts is much lower than observed at the lower treating temperature.

As previously mentioned only a small portion of the octane improvement can be ascribed to removal of oxygenated compounds. The principal reaction must be due to change in the molecular structure of the olefin hydrocarbons. On the basis of the low rate of gas production, it would be assumed that the primary reaction is a shift of the double bond towards the center of the molecule thus effecting octane improvement as shown in Table 1. A complete analysis of the motor-fuel fraction is a practical impossibility due to the large number of possible isomeric components present, however, some ideas of the changes involved may be deduced from examination of the lower boiling cuts.

Separation and analysis of low-temperature fractionation and silica gel percolation indicate that the olefinic content of the C_5, C_6, and C_7 fractions range from 75 to 85 per cent with the olefinicity decreasing with increase in molecular weight. Examination of the olefinic components in these three cuts further indicate that the predominant components are 1-olefins, amounting to 50 to 75 per cent of the total olefins present. The proportion of 1-olefin appears to increase as the molecular weight of the hydrocarbon increases. The C_6 fraction of both the untreated and Perco treated synthetic gasoline was percolated through a silica gel column and the refractive index of each small increment of filtrate was determined. By comparison with published data it was apparent that a large proportion of the C_6 olefin in the untreated gasoline is 1-hexene. In contrast, the corresponding C_6 fraction, after treatment over bauxite, contains only a very small percentage of 1-hexene and the bulk of the olefinic components are present as 2-hexene and 3-hexene, together with minor amounts of the branched chain hexenes. A similar comparison of the full range gasoline before and after treatment shows that the refractive index of the treated gasoline has been shifted upward throughout the whole motor fuel range, as would be expected from either a shifting of the double bond towards the center of the molecule or formation of branched-chain olefins.

A still further indication of the composition change effected by the Perco treatment of the Fischer-Tropsch gasoline can be gained by hydrogenation of the untreated and treated gasolines. Hydrogenation of the untreated gasoline produced a paraffinic stock having an octane rating of 20. Such a result would be expected if the hydrocarbons were primarily straight-chain compounds, and consequently, the olefins present in the original gasoline must be predominantly straight-chain olefins. Hydrogenation of this same gasoline after the Perco catalytic treatment produces a paraffinic stock having an octane rating of 30. The small increase in octane rating, particularly at this low level, indicates that very little chain branching occurs during the Perco treatment and that the isomerization is primarily a shift of the double bond.

References

1. Ninth Annual Report, A.P.I. Research Project 45; 1947.
2. H. Velde. "Treatment of Primary Products of the Synthesis Process and Application of Petroleum Refining." Oel und Kohle 37, 143-148, (1941).
3. R. G. Hay, C. W. Montgomery and James Coull. "Catalytic Isomerization of 1-Hexane." Ind. & Eng. Chem. 37, 335-339 (1945).
4. Lloyd Berge, George L. Sumner and C. W. Montgomery. "Octane Rating Improvement of Olefinic Gasolines by Isomerization" Ind. & Eng. Chemistry; 38, 734-737 (1946).
5. G. M. Brooner and M. W. Conn. "Catalytic Desulfurization of Refinery Gasolines." The Oil and Gas Journal, 45, No. 25, 96, (1946).
6. C. J. Helmers and G. M. Brooner. "Catalytic Desulfurization and Reforming of Naphthas Over Bauxite," Petroleum Processing 3, 133-138 (1948).

Variety of Maps Available At Geological Survey Office

The U. S. Geological Survey maps and reports published during August include four in the Oil and Gas Investigations series including Preliminary Map 85, "Tertiary Geology of the Coastal Plains of Puerto Rico;" Preliminary Map 89, "Map of the Berea Sand of Southeastern Ohio, Northern West Virginia, and Southern Pennsylvania;" Preliminary Map 93, "Geology of the Egnar-Gypsum Valley Area, San Miguel and Montrose Counties, Colorado;" Preliminary Chart 32, "Marine Jurassic Formations of Montana."

Empire Trust Company

NEW YORK

Capital Funds $8,915,863.61
Total Resources $128,880,113.35

Directors

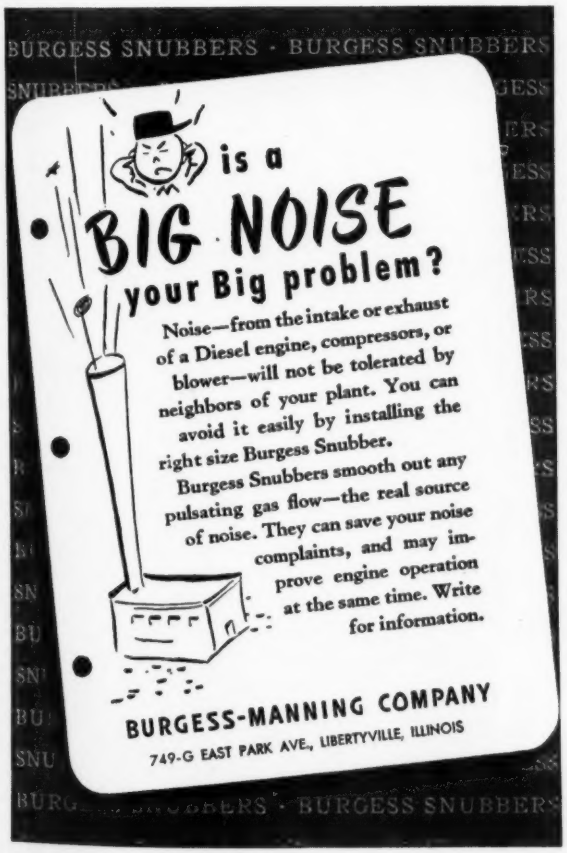
DEAN MATHEY
Chairman of the Board
FRANK V. BALDWIN
Retired
C. KENNETH BAXTER
Chairman of the Board
Deep Rock Oil Company
JOHN T. CAHILL
Cahill, Gordon, Zachry & Reindel
EVERETTE L. DeGOLYER
DeGolyer & MacNaughton
Dallas, Texas
GEORGE A. EASLEY
Vice President, Salt Dome Oil Corp
DEAN S. EDMONDS
Pennie, Edmonds, Morton
& Barrows
CHARLES S. GARLAND
Alex, Brown & Sons
Baltimore, Maryland
ARCHIBALD A. GULICK
Alexander & Green
PAUL H. HUDSON
Executive Vice President
and Secretary
JOHN L. LOEB
Partner, Carl M. Loeb, Rhoades
& Co.
GRAHAM D. MATTISON
Dominick & Dominick, New York
HENRY C. BRUNIE
President
DONALD H. McLAUGHLIN
President, Homestake Mining Co
JULIAN S. MYRICK
Vice President
Mutual Life Insurance Co.
CLENDENIN J. RYAN
President, Big Horn
Cattle Co. of Colorado
ARTHUR A. SEELIGSON
President, Transwestern Royalty Co
San Antonio, Texas
JAMES H. VAN ALEN
Vice President, Farrar, Straus
& Co., Inc.

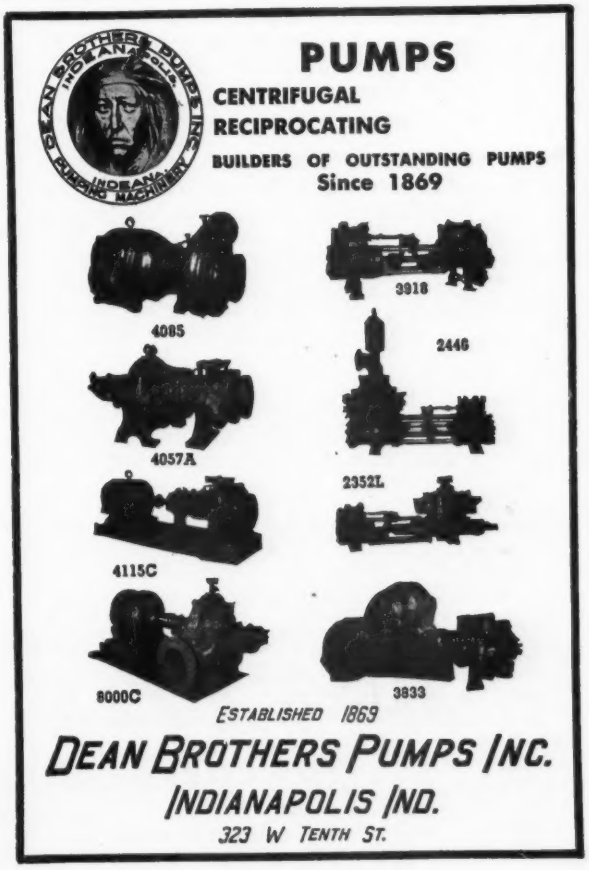
Specialized experience is available for study and suggestions as to sound financing of oil properties

Main Office
120 BROADWAY, NEW YORK

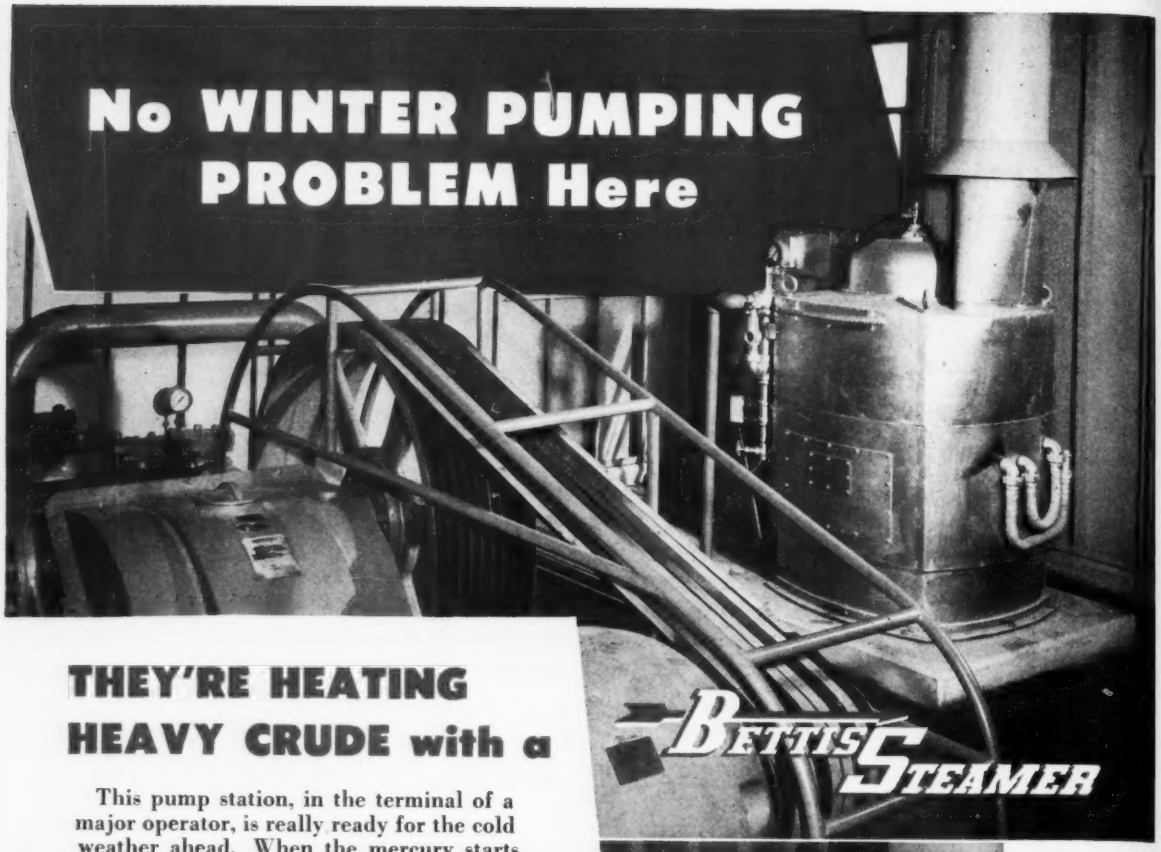
Fifth Avenue Office
580 FIFTH AVENUE

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION


BURGESS SNUBBERS · BURGESS SNUBBERS
is a
BIG NOISE
your Big problem?
Noise—from the intake or exhaust of a Diesel engine, compressors, or blower—will not be tolerated by neighbors of your plant. You can avoid it easily by installing the right size Burgess Snubber.
Burgess Snubbers smooth out any pulsating gas flow—the real source of noise. They can save your noise complaints, and may improve engine operation at the same time. Write for information.
BURGESS-MANNING COMPANY
749-G EAST PARK AVE., LIBERTYVILLE, ILLINOIS



No WINTER PUMPING PROBLEM Here



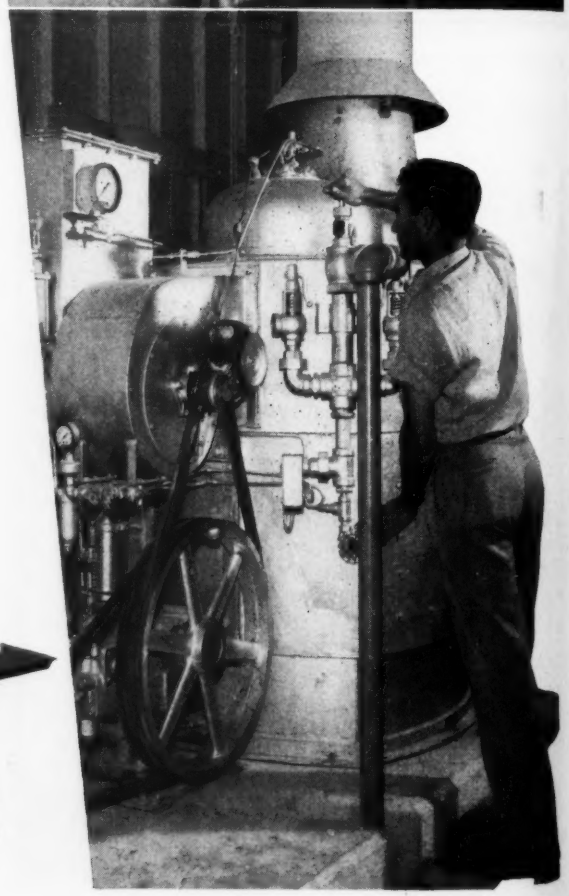
THEY'RE HEATING HEAVY CRUDE with a

This pump station, in the terminal of a major operator, is really ready for the cold weather ahead. When the mercury starts dropping and their crudes begin to thicken, that Bettis Steamer in the corner will be started . . . and there'll be sufficient steam heat to permit the *heaviest* crudes to be pumped *easily* in the *coldest weather.*

Operated by an electric motor or gasoline engine, Bettis Steamers are entirely automatic . . . generate full steam pressure within three minutes after being started . . . may be started or stopped without long "firing up" or "cooling off" periods. Automatic controls maintain selected pressures and prevent any possibility of danger should water or fuel source fail.

To assure efficient winter-time operations, install Bettis Steamers in your pump stations. Sizes are available for every requirement. Full information will be furnished upon request.

Immediate Delivery Can Be Made On Most Sizes



BETTIS

BETTIS CORPORATION

320 South 66th St. P. O. Box 9091

HOUSTON 11, TEXAS

Rocky Mountain Office: Box 515, Casper, Wyo.

University of Texas Well-Sample Library Offers Increased Facilities at New Site

*by Dan E. Feray**

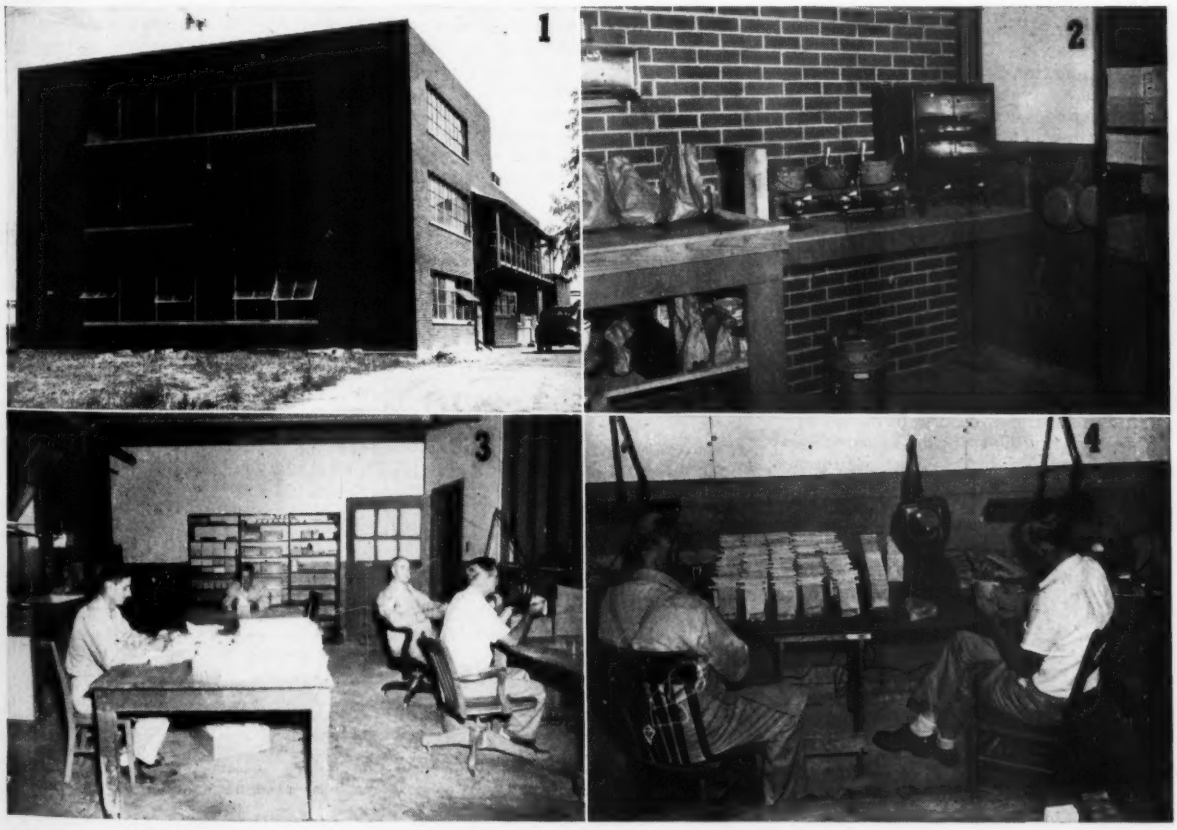
Dr. John T. Lonsdale, director of the bureau of economic geology, University of Texas, announces that the well-sample library of the bureau now offers increased facilities for study of 2,000,000 individual samples representing 25,000 oil, gas, and water wells from every section of the state. This collection, in its new location at the Off-Campus Research Center of University of Texas, now weighs approximately 200 tons, covers 11,050 sq. ft. of floor space, occupies 16,000 cu. ft. of shelf space, and, in length of geologic sections represented, measures approximately 10,000 miles.

EXTENSIVE provisions have been made at University of Texas for accommodating visiting geologists who wish to conduct full-scale research programs at the well-sample laboratory. The collection is housed in a three-story brick building 50 by 110 ft. Research and processing rooms are equipped with adequate facilities for washing, drying, and examining samples. Plans have been made to construct individual research rooms where visitors may keep their equipment and enjoy a reasonable amount of privacy. A freight elevator is in operation to transport bulky and weighty items from one floor to another.

Every effort has been made to provide an easily accessible system for filing and locating material available. As well samples are processed, each well is given a serial number, and the samples are divided into duplicate sets. One set, which serves as a permanent lithologic record of the well and may be examined but not altered, is placed in 1-dram glass bottles fitted with aluminum caps. The other set is stored in 3 by 5-in. manila envelopes and may be washed for foraminifera, dissolved in acid, then sectioned, or subjected to any other process of analysis desired; however, such processed samples remain filed with the library. Each bottle and envelope carries the depth range from which its contents are drawn and the serial number under which both sets are filed. If there is insufficient ma-

*Bureau of economic geology, University of Texas.

1—Well sample library building at the off-campus research center of University of Texas. 2—Laboratory unit in the processing room is equipped with range and oven for washing and drying samples. 3—Processing room where technicians prepare, bottle, and envelope sets of samples. 4—Envelope sample sets carry serial number and depth ranges; may be analyzed by visiting geologists



5

SERIAL NO. 12,345,678 COUNTY Harrison ELEV 709'
COMPANY Doe Oil Co.
FARM J. J. Jones WELL NO 1
SURVEY LOC. 330' FSL, 330' FWL, Sec. 13, Blk 33,
Texas Northern RR Sur.
COUNTY LOC. Green Field, 14 mi. S of Oiltown
SAMPLE RANGE 100'-12,100'
(2 sets) NUMBER OF SAMPLES 980
CONTRIBUTOR Doe Oil Co.
ADDRESS

(a)

Harrison County 12,345,678
Doe Oil Co. # 1 J. J. Jones
Locality: Green Field, 14 mi. S of Oiltown
Sample Range: 100'-12,100'

(b)

Doe Oil Co. 12,345,678
J. J. Jones #1 Harrison County

(c)

J. J. Jones # 1 12,345,678
Doe Oil Co. Harrison County

(d)

5—Office uses card-index system for all well samples and surface samples in the collection. (a) Serial number card. (b) County file card. (c) Company file card. (d) Fee-owner file card

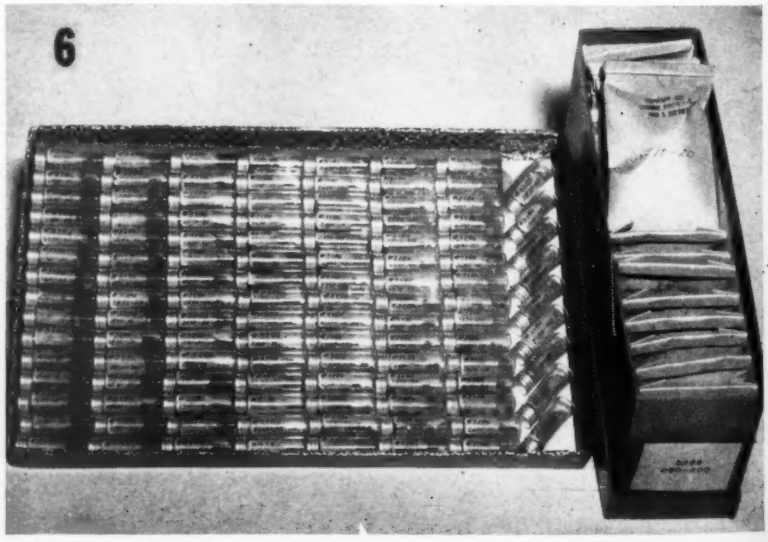
terial for both sets, only a bottle set is filed.

For every well thus filed, a serial number card is made listing the county, operator, fee owner, county and survey locations, sample range, and contributor. In addition, each well is crossindexed according to county, operator, and fee owner. Finally, serial numbers and depth ranges of wells for which accurate locations are known are plotted on county maps.

A general index of all oil, gas, and water wells in the library's collections, to be published soon, will be of interest to the oil indsutry. All wells in the collection will be listed in this index by county and, within each county, alphabetically by company and fee owner. The sample ranges of every well will be noted. Included in the index will be a list of wells for which duplicate samples are on hand. These duplicate samples may be obtained for permanent possession by educational institutions, oil companies, or individuals upon request. The index will also include a list of certain surface samples on file at the library for examination and study.

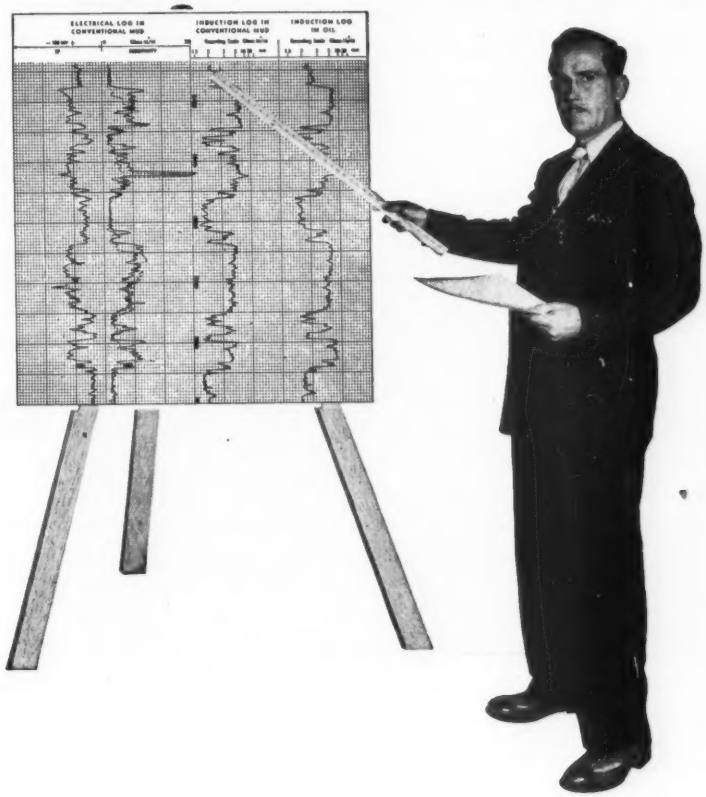
It is hoped that the purposes in establishing and maintaining this library, one of the largest public collections of its kind, will become more thoroughly understood by economic geologists of the Southwest. In general, the well-sample library is designed to promote a greater knowledge of the geology of Texas by bringing together an extensive range of material concerning geologic problems. More specifically, it offers a permanent file of subsurface samples which can be worked and reworked as new discoveries are made and new techniques developed. Dr. Leo Hendricks, a former director of the library, pointed out in a report in 1940 that permanent collection of cuttings and cores from old wells was extremely useful in appraising the value of the Yates sand as a marker in the subsurface of west Texas. A permanent record also provides additional control points for interpreting the structure and stratigraphy of the state. The educational value of this collection to students and teachers of geology is becoming increasingly apparent. In addition to the two

(Continued on page 100)



6—Bottle sets are exact duplicates of envelope sets; remain unaltered as a permanent lithographic record of the well

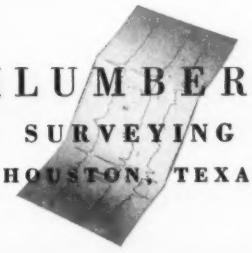
Chapter Eight of The SCHLUMBERGER STORY



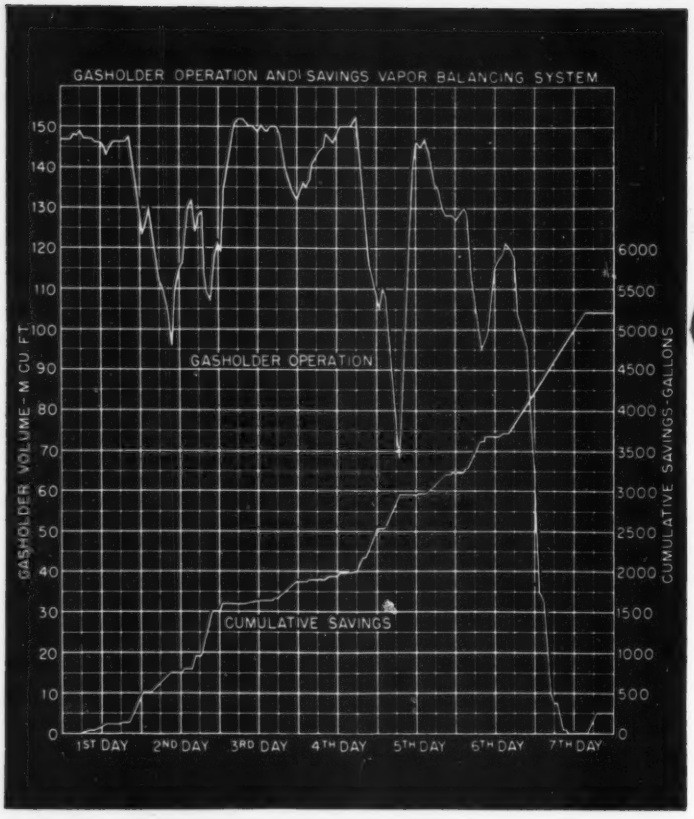
Electrical Logging Technique as Applied to Petroleum Production and Engineering Problem
True RESISTIVITY DETERMINATION
from the Electric Log—
Its Application to Log Analysis
ELECTRICAL EXPLORATION of DRILL HOLES
ELECTRICAL CORING: A METHOD OF DETERMINING BOTTOM-HOLE DATA BY ELECTRICAL MEASUREMENTS
RADIOACTIVE MARKERS IN OIL-FIELD PRACTICE
By R. S. BULL And R. F. SCHWERT
A NEW CONTRIBUTION TO SUBSURFACE STUDIES BY MEANS OF ELECTRICAL MEASUREMENTS IN DRILL HOLES
By C. and M. SCHLUMBERGER And E. G. LEONARDON
APPLICATION OF DEPARTED SURVEYS
By E. F. STRITTER And
ELECTRICAL LOGGING IN THE APPALACHIAN FIELDS
THE S. P. LOG
THEORETICAL ANALYSIS AND PRINCIPLES OF INTERPRETATION
By H. G. DOLL, A.I.M.E.
EXPLORING DRILL HOLES By SAMPLE-TAKING BULLETS
By EUGENE C. LEONARDON And O. C. McCANN

Technical Cooperation

Schlumberger realizes that the use and development of a new idea can only be encouraged by mutual understanding and discussion of that idea between Schlumberger and the oil industry. Schlumberger has, therefore, set up a publications branch of its research department. This branch of the research department will make available new ideas and developments of that department to the industry through national technical societies and petroleum industry papers.



SCHLUMBERGER
WELL SURVEYING CORP.
HOUSTON, TEXAS



Extracting Gold

THROUGH SAVING VAPORS

A perusal of page 11 of the new "Wiggins Vapor Balancing Systems" booklet showing a graph of the active sensitive performance of a "Wiggins Dry Seal Gasholder" together with a "Pay-Out Analysis" table will convince the reader that gold can be extracted through saving vapors.

WIGGINS CONSERVATION STRUCTURES

- Hidek Floating Roofs
- Lodek Floating Roofs
- Balloon Roofs
- Breather Roofs
- Dry Seal Lifter Roofs
- Dry Seal Gasholders

This booklet illustrates and describes the many exclusive Wiggins design and construction features of the "Wiggins Lifter Roof" and the "Wiggins Dry Seal Gasholder."

A copy should be on the desk of every executive and engineer in charge of storage of products subject to evaporation losses. Write today for your copy.

WIGGINS VAPOR SEALS
GENERAL AMERICAN
TRADE MARK

GENERAL AMERICAN TRANSPORTATION CORPORATION

135 SOUTH LA SALLE STREET, CHICAGO 90, ILLINOIS

BRANCH OFFICES: New York • Washington, D. C. • Cleveland • Buffalo • Pittsburgh • St. Louis
New Orleans • Tulsa • Dallas • Houston • Seattle • Los Angeles • San Francisco

Sub-licensees

WESTERN STATES: Consolidated Steel Corp.—Western Pipe & Steel Co. of California, Los Angeles—San Francisco • CANADA: Toronto Iron Works, Ltd. Toronto
SOUTHERN STATES: Wyatt Metal and Boiler Works, Houston — Dallas, Texas • GREAT BRITAIN: Motherwell Bridge & Engineering Co., Ltd., Scotland
FRANCE: Etablissements Delattre & Frouard Reunis, Paris

QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

Poor Absorption of Pentane-plus

According to absorption theory, the heavy hydrocarbons such as pentane and heavier, in a gas should be absorbed more completely than others but our absorber seems to do a poor job on the pentane-plus and a better job on the isopentane and butanes. What are we doing wrong?—R. M. G.

Many things might be wrong, even the analyses of the gases, but it is probable that your absorption oil is not well stripped.

The fundamental relationship between the amount recovered and the amount and kind of absorption oil used is:

$$\frac{A^{n+1} - A}{A^{n+1} - 1} = \frac{y_{n+1} - y_1}{y_{n+1} - y_o} \qquad (1)$$

in which:

A = absorption factor (see Equation 2)
y_{n+1} = mol fraction of component in the feed gas
y_1 = mol fraction of component in the dry gas
$y_o = kx_o$ = mol fraction of component in gas that would be in equilibrium with the lean oil

The absorption factor "A" is dependent only on the component being considered, the temperature, and pressure. It is not affected by the degree of stripping that the oil has undergone, thus:

$$A = \frac{2.156d\,G\pi}{PM} \qquad (2)$$

in which:

d = specific gravity of oil, 60/60
G = gal. oil per M.c.f. gas
π = absorber pressure, psia.
P = vapor pressure of component, psia.

There are empirical improvements of the above equations (Ragatz and Richardson, Absorber Efficiency, The Oil and Gas Journal, November 23, 1946, page 89) but the theoretical equations are satisfactory for the purpose of comparing the degree of stripping of the oil.

The gas shown in Table 1 is to be absorbed in an eight-theoretical-plate absorber operating at 50 psia. and 90° F. Table 1 also shows the equilibrium constants for the absorber, the absorption factors, and the values of $(y_{n+1} - y_1)/(y_{n+1} - y_o)$.

Inadequately Stripped Oil

If the absorption oil is adequately stripped (say isopentane mol fraction of 0.0003) the values of "y_o" in the $(y_{n+1} - y_1)/(y_{n+1} - y_o)$ term of Equation 1 will be negligible and the last column of Table 1 is the fraction of each component that is absorbed. Thus, 20 per cent of the propane will be absorbed, and all of the pentane, hexane, and heptane.

However, if the oil is poorly stripped to say an isopentane mol fraction of only 0.00416, the absorption of isopentane will be ineffective:

$$y_o = kx_o = 0.37 \times 0.00416$$

$$= 0.00154$$

$$\frac{y_{n+1} - y_1}{y_{n+1} - y_o} = \frac{0.0234 - y_1}{0.0234 - 0.00154} = 0.99$$

$$y_1 = 0.0234 - 0.99\,(0.0234 - 0.00154)$$

$$= 0.0234 - 0.02164$$

$$= 0.00176$$

Thus, the percentage of isopentane absorbed is no longer 99 per cent, but is:

$$\%\ \text{absorbed} = \frac{0.0234 - 0.00176}{0.0234} \times 100$$

$$= 92.7\%$$

Similar data for each of the components are shown in Table 2, along with the percentage absorbed when using a well-stripped oil. The poorly stripped oil of Table 2 contains only 1.2 mol per cent of hexane (boiling point of 158° F.) and only 0.15 mol per cent of isobutane. These small quantities are, however, not at all negligible in their effect on the absorber.

The degree to which the oil is stripped has a vital effect upon the efficiency of absorption. Thus, if the oil were only half as well stripped (mol fraction of isopentane of 0.00832) none of the heptane would be absorbed and only 55 per cent of the hexane.

TABLE 1—BASIC DATA FOR ABSORBER

Component—	Mol fraction	Equi. K.	A	$\frac{y_{n+1} - y_1}{y_{n+1} - y_o}$
Ethane and lighter	0.8449	large		
Propane	0.0715	2.8	0.2	0.2
Isobutane	0.0139	1.2	0.46	0.46
Butane	0.0255	0.9	0.615	0.61
Isopentane	0.0234	0.37	1.5	0.99
Pentane	0.0158	0.24	2.3	1.00
Hexane	0.0040	0.077	large	1.00
Heptane	0.001	0.025	large	1.00

TABLE 2—EFFECT OF POORLY STRIPPED OIL

Component—	Mol fraction in oil, x_o	y_o	y_1	Per cent rec.— Poor oil	Good oil
Ethane and lighter					
Propane				20	20
Isobutane	0.00150	0.00180	0.00844	40	46
Butane	0.00208	0.00187	0.0111	56.5	61
Isopentane	0.00416	0.00154	0.00176	92.7	99
Pentane	0.00500	0.00120	0.0012	92.2	100
Hexane	0.012	0.00092	0.0009	77.5	100
Heptane	0.023	0.00058	0.0006	40.0	100

Cascade Tray

In your Refiner's Notebook No. 310 you mention that some experimental data exist on the Koch Kaskade tray. Can you give any information on this type of tray as compared with conventional bubble trays, particularly with respect to the separation attained?—R. O. B.

Although conventional bubble trays have now been used for many years, scarcely any information on their behavior in plant practice has been published. There are, of course, many discussions of a theoretical nature, particularly with regard to two-component systems, but difficulty is encountered in applying these discussions to multicomponent plant operations.

The behavior of Kaskade and conventional trays, when used for natural-gas absorption, is indicated by H. Litwin in the March 22, 1947, issue of The Oil and Gas Journal under the title, "Cascade-Type Tray Introduces New Fractionating Principle." This commercial comparison is not conclusive except with regard to capacity—the 6-ft.-diameter Kaskade absorber handled as much as the 7-ft. conventional absorber. This means a capacity of about 36 per cent larger in the Kaskade absorber. The separation attained appears to be about equal in both towers or, since 16 Kaskades behaved as well as 20 bubble trays, the Kaskade trays are 20-25 per cent more efficient than conventional trays. However, although the Kaskade trays may have a 25 per cent

higher efficiency, such a difference in plate efficiency scarcely changes the composition of the materials that are produced.

Two sets of unpublished data on the behavior of Kaskade trays of the benzene fractionator of a cumene plant are shown in Table 1. The tower contains 18 cascades and the diameter of the tower is 4 ft. 0 in.

TABLE 1—BEHAVIOR OF KASKADE BENZOL STRIPPER

	Test 1	Test 2
Capacity, b.-hp.	89	141
Reflux ratio	0.475	0.254
Gap between e.p. and i.b.p. of products, °F.	68	12
Overhead product, per cent	71	81

A.S.T.M. distillation:	Ohd.	Bott.	Ohd.	Bott.
I.b.p.	146	286	157	262
10 per cent	172	296	170	288
50	174	302	173	300
90	176	316	176	306
End point	218	398	250	352

No. 1 test indicates an exceedingly good separation (plate efficiency far above 100 per cent) whereas the No. 2 test shows the ordinary separation attained with an 100 per cent tray efficiency.

An outstanding feature of the Kaskade tray is the large path for liquid or vapor flow that can be provided. This is possible because vertical as well as horizontal areas can be used for vapor travel in the Kaskade tray. The cascade-type of tray provides from 0 to 100 per cent (or as needed) more vapor uptake area, about 50 to 1,000 per cent more downflow area, about 80 to 1,000 per cent more weir length, and about 13 to 360 per cent more slot area (counting the mixing area between plates of the Kaskade as slot area). The wide ranges just stated show the wide range of design that has been offered as conventional bubble trays.

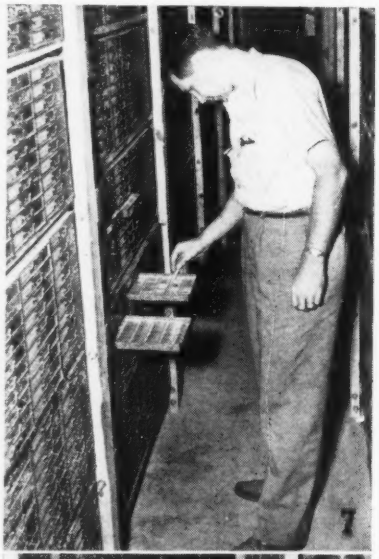
University of Texas Well-Sample Library

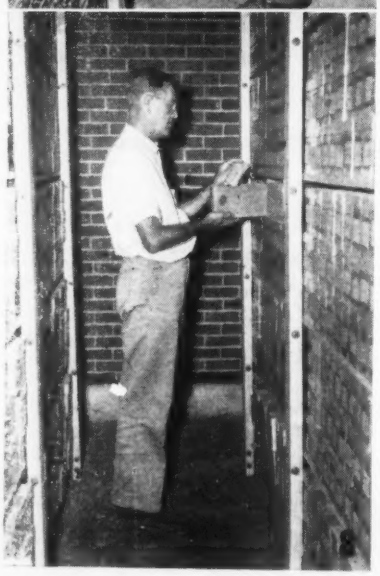
(Continued from page 96)

permanent sets retained in the collection, duplicate samples, mainly from the coastal plains, are available to oil companies and educational institutions upon request. An index of duplicate sets will be published in the general index now in preparation.

The well-sample library also offers an initial field of research for many special studies. The geology department of University of Texas draws upon this collection as a basis for subsurface studies covered by various courses. The collection has been used in the subsurface studies of Dr. V. E. Barnes in Gillespie and Blanco counties, Dr. Leo Hendricks in the Ellenburger group, Mrs. Helen Jeanne Plummer in Cretaceous and Tertiary formations, Dr. Dan E. Feray in the Weches formation, and by others. This collection serves also as a basis for the research conducted in conjunction with the revision of the bureau's structural map of Texas.

The well-sample library has grown to its present size in response to a public need. Long before this need was officially recognized, the collection of well samples was begun under the administration of Dr. J. O. Udden, 1914 to 1932. Dr. Udden's interest in subsurface stratigraphy, accompanied by his active study of well cuttings, created a slow but steady increment of samples to the bureau of economic geology for examination and subsequent filing. As more and more oil operators became aware of this service, the influx of samples increased to such an extent that a large backlog of material from every section of the state accrued and, when processed, formed the basis of the present collection. Oil companies began to realize the vital importance of this repository and donated excess well samples from their files to augment the bureau's collection. Currently, the Midland sample library and Amarillo well-sample service, oil companies, and independent operators are the chief contributors to the collection.





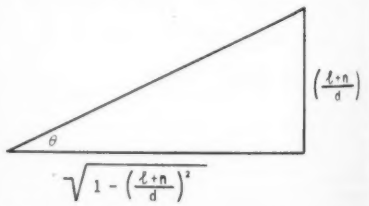
7—Bottle sets are stored in handy T-10 legal file cabinets. 8—Envelopes are filed in cardboard boxes 11½ by 3 by 5 in. which are stacked in standard library shelves. Both are arranged according to serial number

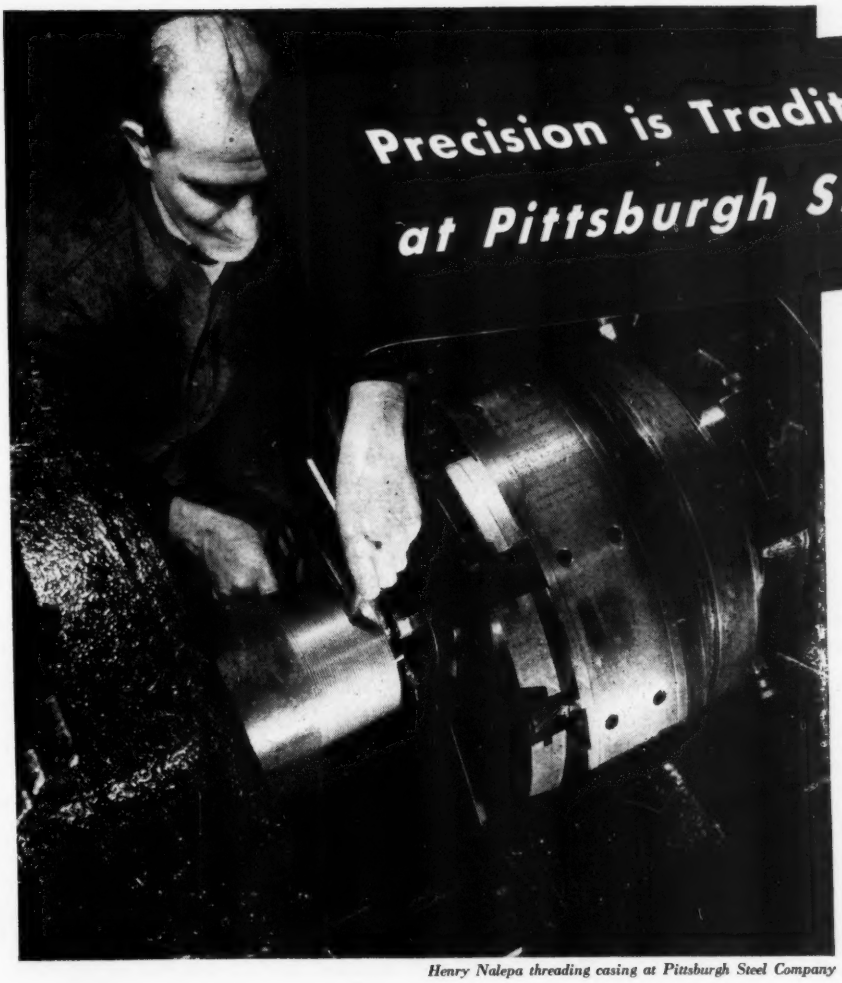
Through the courtesy of Dr. E. H. Sellards and Dr. H. H. Bybee, the state legislature in 1937 granted authorization and appropriations for establishing the well-sample library under the supervision of the bureau of economic geology. Dr. Leo Hendricks was appointed as supervisor of the library, which was moved in 1942 from the main offices of the bureau of economic geology on the Little Campus to Sutton Hall and the Old Library Building on the main campus of the university where it occupied some 8,500 sq. ft. of floor space. Recently, the well-sample library was allotted permanent quarters in the new off-campus research center of the university. From 1945 to July 1948, the supervision of the library was under the direction of J. L. Starnes. The well-sample library is now directed by Dr. Dan E. Feray, who is assisted by three full-time employes: Odell Bostic, assistant supervisor, and A. D. Davidson and J. N. Stewart, technicians. Two part-time typist-clerks, A. P. Collins and J. A. Woodward, are also employed.

Many other publications and supplementary data are also available at the Well Sample Library. A well-stocked library of current and pertinent periodicals includes The Oil and Gas Journal, The Oil Weekly, bulletins of the Bureau of Economic Geology and the American Association of Petroleum Geologists, Journal of Paleontology, and many other standard reference works.

'Combination Casing Strings' Fig. 3 in Appendix

In the article, "Direct Method for Calculating Length of Section Simplifies Design of Combination Casing Strings," by B. E. Curran, Spang-Chalfant Division, National Supply Co., Pittsburgh, which was published in the Journal issue of October 14, page 80 et seq., the appendix section contained derivation of equations for section length affecting collapse resistance. Fig. 3 discussed therein was inadvertently omitted in the presentation but is reproduced here.





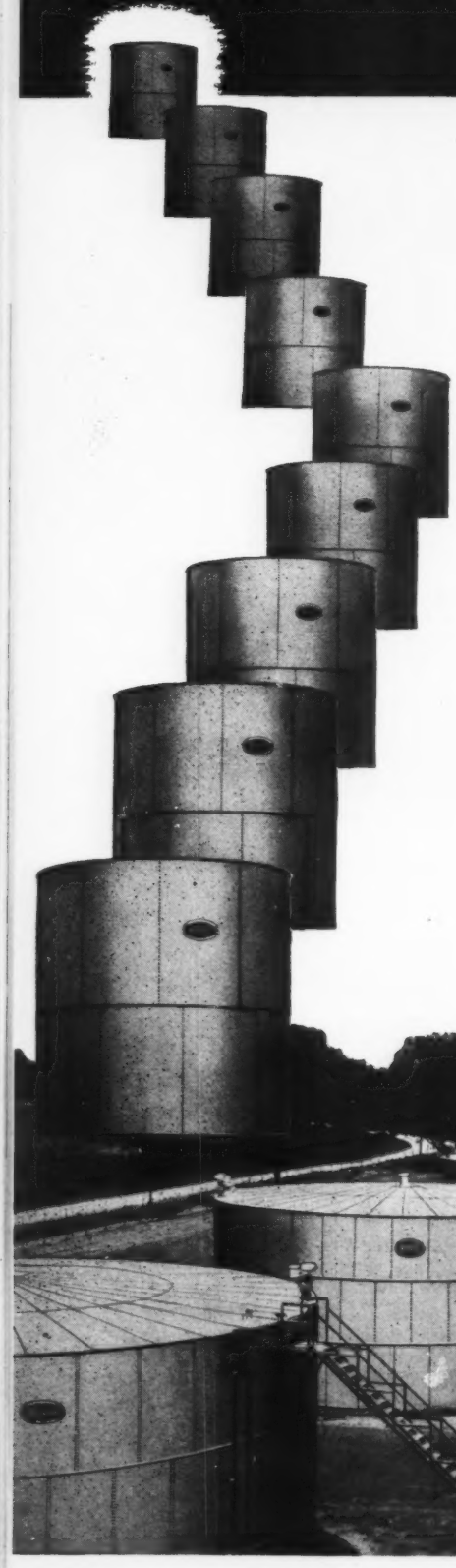
Henry Nalepa threading casing at Pittsburgh Steel Company

Pittsburgh Seamless oil country goods give you good reliable service year in and year out because of tradition—for example the tradition of making precision threads. As pioneers in precision threading Pittsburgh workmen aided by expert technical advice and up-to-date equipment have continued to lead in producing the best in seamless drill pipe, casing and tubing. This leadership is a moving force as we constantly seek ways to improve methods—so that we may better meet the requirements of the oil and gas industry. Pittsburgh Steel Company, 3241 Grant Building, Pittsburgh 30, Pa.

PITTSBURGH STEEL COMPANY

On Line Production
n Line With Demand

BUTLER BOLTED TANKS QUICKLY AVAILABLE



Now! Prompt delivery—for a quick solution to your oil-field storage problems. Butler Bolted Tanks are available now, ready to bring you lifetime economy for the storage and handling of crude or finished petroleum products.

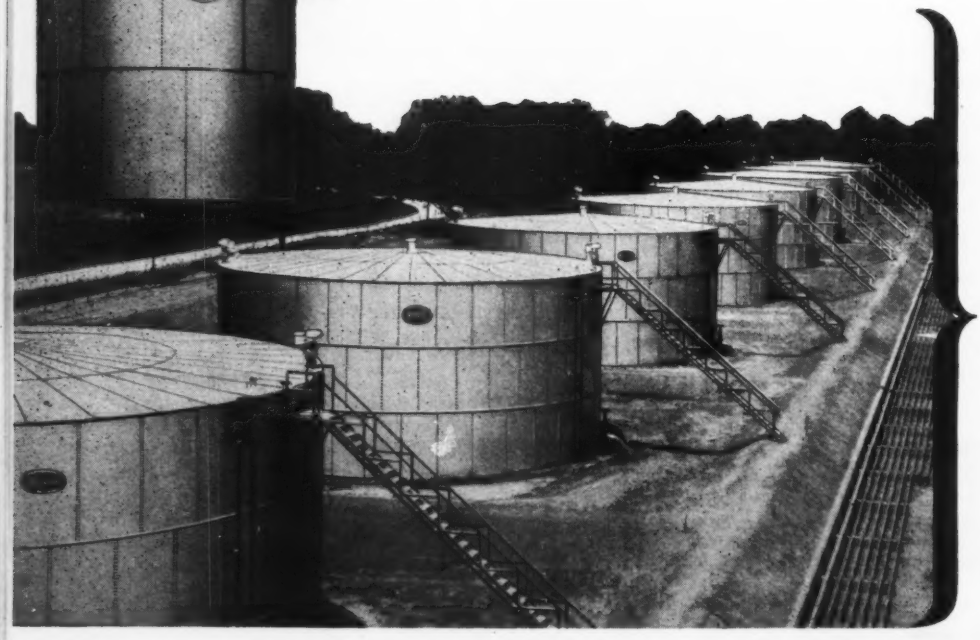
Without delay, you can profit by the precision fabrication, ease of erection, oiltight protection which these time-proved storage tanks give you.

As long as steel is available, you will be able to get prompt delivery on Butler Bolted Tanks. Butler's efficient line production methods assure you of that!

Call your nearest Butler distributor now—while tanks are in good supply.

BUTLER MANUFACTURING COMPANY

Kansas City, Mo. Galesburg, Ill. Richmond, Calif. Minneapolis, Minn.



Call These Experts for Prompt Service

AMERICAN PIPE & SUPPLY CO.
Denver, and Rangely, Colo.
Casper, Wyo.
Cut Bank, Mont.

HARRY G. MILLER
El Dorado, Ark.

UNION TANK & SUPPLY CO.
Fort Worth, Houston, Odessa
Alice, Texas
Lafayette, La.
Great Bend, Kans.
Tulsa, Oklahoma City, Okla.
Hobbs, N. M.
Jackson, Miss.

BUTLER

BOLTED TANKS • WALKWAYS • STAIRWAYS • UNIT HEATERS

Fig. 1—(Left) Close-up view of sniffer showing plow blade and skids. A length of ½-in. pipe for withdrawing air samples is welded down the back of the blade and terminates in several ⅛-in. holes near the point. Small dust trap may be seen above tongue of device. Pictured with "sniffer" are Harry Gavin, left, and Maxwell Orr, right, who designed the device. Fig. 2—(Right) Electrical atmosphere detector and water jar for saturating air sample are pictured on running board of power wagon. In operation, these are placed in the cab of the vehicle. Indicating dial is located on top of detector

Locating and Repairing Leaks in "Biggest Inch" Natural-Gas Pipe Line

by Herndon David

SOUTHERN COUNTIES GAS CO. of California, in order to make thorough and complete checks of the California section of the "biggest inch" natural-gas line, jointly owned by this company and Southern California Gas Co., which extends from the Permian basin in West Texas to Los Angeles, has developed a unique and rapid method of making accurate, continuous leak surveys over long sections of natural-gas line. The new method functioned so accurately during a recent survey that bubble tests with soap and water were required in several instances to locate the hole in the pipe after the leak had been uncovered.

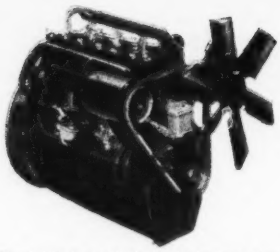
Following completion of the biggest-inch line, Southern Counties conducted a minimum-pressure-standup test of 8 to 10 hours duration. While the test was under way, a complete walking patrol of the line was made and approximately five leaks uncovered. As a result, the company decided to run a leak survey of the entire line merely as a precautionary measure. At the time the decision was reached, several methods were in use by gas companies to find leaks in long-distance transmission lines. These included observation of dead vegetation, bar holes, flashing bar holes by flame, and the use of atmosphere detectors. None of the methods, however, provided a continuous survey.

Since the electrical atmosphere detector is the most accurate instrument for locating leaks in gas lines, employes of Southern Counties set about devising a method of moving it over the line while it was operating. The resulting implement was a device called a "sniffer" and capable of withdrawing air samples from 14 or 15 in. below the surface of the earth while being towed along on the surface.

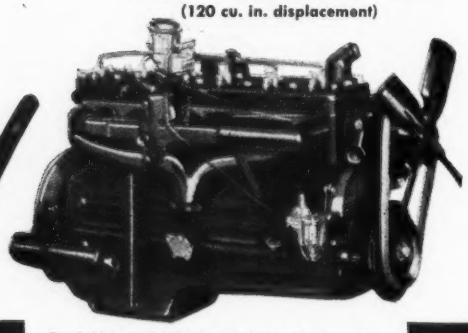
(Continued on page 106)

Fig. 3—Sniffer in operation is towed along, cutting a 15-in. furrow in the trench backfill and withdrawing a continuous air sample from beneath the surface

Here's the New FORD Power-Family



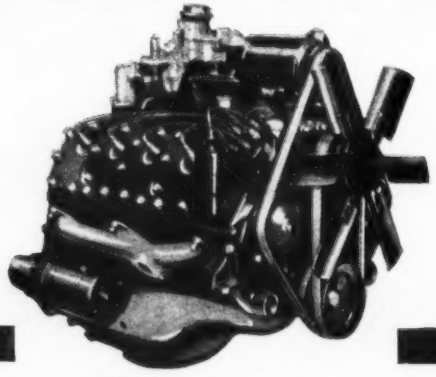
Ford 120 Four Cylinder Industrial Engine
(120 cu. in. displacement)



Ford 226 and 254 Six Cylinder Industrial Engines (226 and 254 cu. in. displacement)

1 "FOUR" . . . 2 "SIXES" . . . 2 "EIGHTS"

Here they are . . . five great, brand-new Industrial Engines built by Ford! Look 'em over—every one the product of Ford experience . . . every one with famous Ford reliability built in . . . every one complete and ready to run! For *new* power, for *right* power, use Ford Industrial Engines, completely new!



Ford 239 V-8 Industrial Engine
(239 cu. in. displacement)

When It's FORD POWER . . . it's right 3 ways!

RIGHT POWER—A full power range, from the maker that knows power best . . . from Ford!

RIGHT FEATURES—Ford Industrial Engines incorporate the latest advancements of Ford's progressive engineering. You're never outdated when you pick Ford power.

RIGHT SERVICE—Ford Dealers provide complete parts and service facilities around the world. They keep Ford power on the job, save you time and money!

Ford 337 V-8 Industrial Engine
(337 cu. in. displacement)

FORD MOTOR COMPANY
INDUSTRIAL AND MARINE ENGINE SALES DEPARTMENT
3503 Schaefer Road • Dearborn, Michigan

YOUR JOB IS WELL-POWERED WHEN IT'S FORD-POWERED

DIGESTS

PENN STATE SECONDARY RECOVERY

Presented here are digests of the 17 papers on repressuring, flooding, core analysis, and electric logging given at the twelfth annual technical meeting held October 14-16 at Pennsylvania State College, State College, Pa., in cooperation with the Pennsylvania Grade Crude Oil Association.

Streaming Potentials in Electrical Well Logging

M. T. KOZARY, Pennsylvania State College.

SOME properties of streaming potential, important to the interpretation of self-potential electrologs, were experimentally investigated. A glass capillary tube and a natural sandstone core were found to behave alike, in that the streaming potential it generated was proportional to the total pressure drop and the length. In a capillary, it is proportional to the radius.

Streaming potential decreases to a limit at moderate brine concentration. Its value in a typical well situation may amount to 20 mv. It can be neutralized or reversed by the addition of aluminum chloride.

In a simultaneous oil-water flow, streaming potential appears abruptly when the proportion of water rises to around 85 per cent. When water drives oil through an oil-saturated sand, streaming potential appears suddenly when the first threads of water penetrates through; this occurs at about 40 per cent water saturation.

Laboratory Tests of Electrolog Resistivity Interpretations

JOHN C. COOK, Pennsylvania State College.

PRELIMINARY tests of the theory and technique of determining formation porosity and permeability by resistologging have been performed on a laboratory model of an oil well. The method involves two operations: invasion of the formations by fresh water under pressure, and running a set of multielectrode resistologs of various "effective penetration." It was found difficult to eliminate instrumental effects without careful electrical design and testing.

Interpretation of the data by existing theory revealed serious limitations. Porosity cannot as yet be calculated from resistologs in the model well due to contamination of invasion water by brine. Inhomogeneity of formations makes the invasion-water boundary indefinite which greatly reduces the accuracy of permeability calculations. With instrumental and interpretational refinements, it is expected that more promising results will be obtained which may prove of considerable usefulness of calibrating similar experiments in the field.

Field Experiments in Intermittent Water Injection in Gas Injection Wells

D. P. BOSSLER, Oil City, Pa. (University of Texas undergraduate) and BRUCE F. GRANT, U. S. Bureau of Mines Station, Franklin, Pa.

RESULTS were given for six air-injection projects where the intermittent injection of water into air injection wells is being tried. There were 13 injection wells involved. To date, injected water has had a negligible effect on oil-production rates of offsetting producing wells. Two producing wells showed greatly increased water production.

The injected water has caused a decrease in the effective permeability to gas of each well into which water has been injected. It is pointed out that the history of the properties shows that water content of the oil sands is probably high because of previous low-head water floods from poorly abandoned wells. Evidence indicates the water might be more effective if injected in smaller amounts and alternated with air injection only as often as necessary to keep the selective reduction of injectivity capacity by the water effective; or as needed to replace produced liquid, in order to maintain a constant liquid content in the sand.

Current Mineralogical Research in Oil Finding

DR. PAUL D. KRYNINE, Pennsylvania State College.

THE present basic concept of the "structural high" in oil exploration may have to be supplemented by an equally basic concept of the "specific oil reservoir or trap," i.e., a rock that stores oil preferentially against other porous rocks, and which probably accounts for most oil fields of the Appalachian type. The primary controlling factor in this case is the morphology of the pore pattern and the physio-chemical potentialities of the enclosing walls as determined by the texture and composition of the reservoir rock. These characteristics vary between the three major sandstone classes (quartzites, graywackes, arkoses) and the carbonate rocks.

Very detailed quantitative petrographic and physical studies under strict statistical control are being carried at Penn State on the relationships between measurable porosity and permeability, pore pattern, petrographic parameters, field occurrence, probable genetic relationship, and possible practical shortcuts, potentially suitable for utilization as oil-finding tools.

Petrographical Evaluation of Porosity Measurements

J. C. GRIFFITHS, Pennsylvania State College.

THE significance of porosity measurements, determined by standard methods, bulk and grain density, and saturation, is shown to be controlled by the petrographical constitution of sands. The different rock types, Oriskany (typical ortho-quartzite), Venango (incipient ortho-quartzite), Bradford (graywacke), Trinidad Miocene (graywacke), and Sespe (California arkose), show different pore patterns. Difference in reservoir behavior can be correlated with differences in mineral composition and arrangement in the sand samples investigated. Very close statistical control of the measurements is necessary to evaluate experimental error and segregate the actual variation as the differences are generally small.

Porosity and Cementation

M. A. ROSENFELD, Pennsylvania State College.

THE factors affecting the porosity of a rock are sorting, particle size, grain shape and roundness, fabric, and cementation. Where cements are present, their effect is usually dominant over the effect of the other factors. A mathematical method has been developed for removing the cement in order to study the control exercised by the other parameters. The Bradford Third sand and the Venango sands, both of graywacke or winnowed graywacke type, show no apparent textural control over cementation. However, a typical ortho-quartzite-type sand gives evidence of possible textural control upon the emplacement and amount of cement. Alternative possibilities are offered for the distribution of cements in sands.

Petrography and Reservoir Potentialities of the Nittany Dolomite

R. L. FOLK, Pennsylvania State College.

THE Lower Ordovician Nittany dolomite comprises 1,200 ft. of porous and cavernous dolomite. Detailed petrographic and physical studies, now in progress, show that the formation is made up of a large number of complex lithologic units. These have been divided into five major rock types (light dense dolomite, dark dense dolomite, fine crystalline dolomite, coarse crystalline dolomite, and fucoidal-oolitic dolomite), each of which has several subtypes. These rock types are concentrated differentially in succeeding stratigraphic zones, with a slight tendency to form cyclothems. An evaluation is made of the character, importance, and time of origin of each of six types of porosity (vacuole, interstitial, disseminated open, bedding plane, cavernous, and joint plane). The abundance and type of porosity has a definite correlation with the major rock types.

Subsurface Projections of Possible Oil and Gas Bearing Deep Horizons in Pennsylvania

DR. F. M. SWARTZ, Pennsylvania State College.

A FIRST and essential problem in exploring deeper horizons for oil possibilities in the Allegheny front is the building of knowledge about the probable characters of the strata in their subsurface areas. Studies of the sub-Oriskany sediments at their outcrop regions in Pennsylvania and New York, and correlation with their occurrences in deep wells, have been used to build up a series of maps showing thicknesses, geography of distribution, and regional changes in sandstone-shale-limestone-dolomite compositions of the successively deeper Lockport-Clinton, Medina-Tuscarora, Juniata-Oswego-Bald Eagle, Trenton, Chazyan, Beekmantown, Upper and Middle Cambrian, and Lower Cambrian strata of the New York-Pennsylvania region.

Attention is directed especially to the character and reservoir possibilities of the Medina-Tuscarora sandstones, the Oswego-Bald Eagle sandstone, the Beekmantown dolomites, and the Upper Cambrian dolomites and sandstones. It is clear that from the viewpoint of original characters as sediments, these deep strata have the characters of a petroliferous sequence. Problems remain as to the degree of dissipa-

tion of the oil and gas these sediments have in the past contained, as well as concerning economic exploration under their conditions of depth.

Formation Clay Minerals And Electric Logging

L. O. BACON, Pennsylvania State College.

RESULTS of investigations on natural potentials caused by formation clay minerals are discussed. Observations made on natural cores justify the empirical interpretation of self-potential logs as indicators of permeable zones. The effects of pH, electrolytes and salinity on self-potential, and investigation of sand-clay mixtures show that there is little possibility of obtaining quantitative information on porosity or permeability from self-potential logs.

The existence of natural potentials of clay minerals is explained by desorption of adsorbed cations. Adsorbed ions from the surface of the clay particle pass into the surrounding fluid until equilibrium is reached between the tendency of ions to desorb and the rate of readsorption of free ions from the electrolyte. The observation on self-potential logs that potentials opposite sands are more negative than potentials opposite shales is explained by desorption.

Reservoir Characteristics And Electric Logging

DR. SYLVAIN J. PIRSON, Pennsylvania State College.

PRACTICAL attempts have been made to secure reservoir engineering data from regular and special electric logs. Quantitative correlations of porosity and permeability profiles respectively with the self-potential and self-potential differential profiles have not shown much promise. On the other hand, quantitative correlation of differential resistivity effects between normal curves obtained before and after invasion of a well by fresh water gave encouraging results.

Capillary Pressure Studies

S. T. YUSTER and C. D. STAHL, Pennsylvania State College.

A STUDY has been made of the possible application of the capillary pressure technique to a determination of connate water in Bradford field and the results obtained indicated that it could not be applied except with modifications. The discrepancy between the field and laboratory values may be due to a combination of a break in the continuity of the displaced phase and wettability. The use of the capillary pressure technique to predict the residual saturation after a water flood gives qualitative results at the present time but with some modification may be made more accurate.

A Study of the Mechanism Of Air-Gas Drive

D. E. MENZIE and R. F. NIELSEN, Pennsylvania State College.

THERE is a difference of opinion as to the effect of increased pressure gradients during secondary-recovery processes upon ultimate recovery of oil. In an attempt to clarify this problem the pressure gradient during a series of air drives was varied. A study was made of the air-drive mechanism in a consolidated sandstone 100 per cent saturated with brine, for eight different driving pressures. Saturations were measured by conductivity on separate sections of the core. Volumetric measurements were made of gas and liquid production throughout the runs. Curves are presented to show the production histories and final residual saturation distributions for the eight different pressure gradients. The relationship of capillary pressure, irreducible minimum saturation, and final residual saturations are also discussed.

Long Core Experiments With Brine Floods Following Depletion With Gas Drive

J. N. BRESTON and R. V. HUGHES, Pennsylvania Grade Crude Oil Association Research Laboratories, Bradford, Pa.

THIS investigation on horizontal cores from the Franklin oil mine obtained the following results:

1. Slow production rates during natural internal gas drive gave better recovery than rapid production rates.

2. Water flooding following a gas drive is better than straight water flooding and an additional 10 to 15 per cent recovery may be attained depending upon the saturation.

3. Alternate gas and water slugs were effective in increasing recovery, the final oil saturations obtained being of the order of 28 per cent.

4. The simultaneous injection of water and gas was found to be the best technique of recovery.

Directional Permeability Measurements and Their Significance

W. E. JOHNSON and R. V. HUGHES, Pennsylvania Grade Crude Oil Association Research Laboratories, Bradford, Pa.

A STUDY was made on the effect of direction on permeability. An apparatus was developed for determining the radial distribution of permeabilities and data were obtained from several oil-producing sands in the Pennsylvania and New York oil-producing area. In all cases, a directional trend was found and with reference to the Bradford sands, the highest permeability was perpendicular to the axis of the field. Importance of this behavior in development programs for both primary and secondary-recovery oil production is indicated.

Some Factors Affecting Production by Air-Gas Drive

R. F. NIELSEN and D. E. MENZIE, Pennsylvania State College.

IN order to evaluate separately the contributions of individual factors or variables toward production by air-gas drive, certain types of idealized laboratory experiments are necessary. Among the variables affecting the production history of an air drive are the viscosities of the fluids and the distance from input to producing wells. Laboratory experiments with long cores are described into which these two variables enter. The data are interpreted in the light of theoretical considerations which may prove useful in predictions of field behavior.

Shooting in Water Flooding

DR. S. T. YUSTER, Pennsylvania State College.

IN the study made on the effect of shooting in water flooding, effect of shooting on spacing, development and operating cost, and gross profit are considered. A corrective shooting formula and chart have been developed which give the shell size as a function of permeability ratio, in order to cause the flood to penetrate more uniformly. Other factors such as self-correctiveness, multiple shooting, and tamping are also discussed. A brief outline of shooting problems also is made.

Progress Report on Multiphase Flow Studies

J. H. HENDERSON, Pennsylvania State College.

THE multiphase flow studies (South Penn Oil Co. research project) include work on relative permeability and long core flooding tests. One of the important points brought out was where there is an apparent shift of the relative permeability saturation relationship with a change in velocity of fluid on pressure gradients.

Locating and Repairing Leaks in "Biggest Inch"

(Continued from page 103)

The "sniffer" has the appearance of a plow mounted on semicircular skids. The plow blade of the sniffer is made from a ¼-in. steel plate edged with hard-facing metal. Welded to the back edge of the blade is a ½-in. pipe which terminates in several ⅛-in. holes near the point of the blade. In operation, the plow blade is set to submerge approximately 15 in. below the surface in the trench backfill. When being moved to and from the job, the device slides along smoothly on the semicircular skids.

Withdrawal of air samples from beneath the surface of the earth is accomplished by connecting the pipe welded to the plow blade to the vacuum manifold of the vehicle which draws the device. (Through most of the recent survey a four-wheel-drive power wagon was used to draw the plow, although in extremely hilly terrain a tractor was required.) This is accomplished with a rubber tube which connects the pipe to the inlet side of the electrical detector. The outlet side of the detector is in turn connected to the manifold of the power wagon with another length of rubber tubing. Thus a sample is drawn from the earth and through the detector by the vacuum. A small dust trap and a bubbler to indicate suction also are provided in the connecting system.

When the sniffer is in operation, two men ride in the cab of the power wagon, one as an observer and the other as the driver. The electrical detector is placed in the cab and set to give a zero reading on the indicating dial. As the plow is towed along, the observer watches for any fluctuation of the indicating needle which would mean a leak in the line at the point where the fluctuation occurred. The

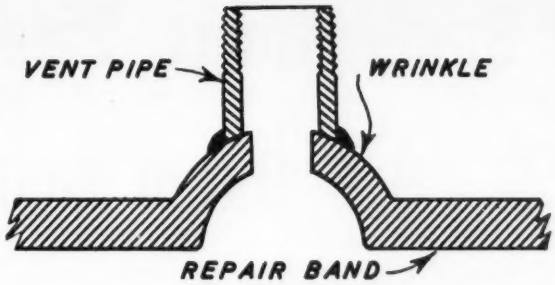


Fig. 4—Cross-sectional view of repair band. Wrinkle and vent pipe are used to vent gas from leak into the open air so that operation of the line may continue while band is being welded into place to repair the leak

line is marked for a repair crew at the point where a leak is located and the survey continues. As previously mentioned, a recent leak survey indicated leaks so small that repair crews were forced to resort to bubble tests with soap and water in order to locate the hole in the pipe after the earth had been removed.

Wrinkle-Band Leak Repair

The method of repairing leaks in the 30-in. line, although not entirely new, is also interesting. Steel bands which completely circle the pipe are used rather than patches, since patches set up stresses at their corners after they are welded in place. The bands employed are made in two semicircular pieces and are 6 in. in width for leaks in girth welds of the line and 12 in. in width for leaks in longitudinal welds. In the center of each band, and extending fully around the circumference is a wrinkle. (See Fig. 4.) At some point in this wrinkle there is welded a vent nipple. Purpose of the wrinkle and vent nipple is to vent the gas from the leak to the air so that the line does not have to be shut down while the band is being welded in place.

When a repair is made, a gasket is placed inside the band opposite the vent hole. This gasket fits snugly into the wrinkle so that when the band is placed on the pipe the flow of gas from the leak is restricted and must go out the vent nipple to the open air. The band is then welded in place by full girth welds at each end of the band. After the repair band is welded in place, a steel plug is inserted in the vent nipple and screwed tightly into place. A cap is then placed over the outside of the vent nipple and welded in place, thus giving a completely welded job for the leak.

In instances where the leak in the line is a large, blowing leak, a plug-off machine must be used in order to insert the inside plug in the vent nipple. The plug is placed inside this machine and the machine screwed onto a temporary valve installed on the vent nipple. The machine is then closed to allow the pressure inside to equalize with the pressure in the line. The plug can then be screwed tightly into place and the machine and temporary valve removed. Since the plug stops the leak, the cap can be placed over the outside of the vent nipple and welded into place.

To date, all leaks uncovered have been repaired in this manner, and the sniffer has performed so efficiently that officials of the California companies believe the line to be entirely leak free. In the future they plan to patrol the entire line with the sniffer at frequent intervals.

Special "Water Ways" Cut

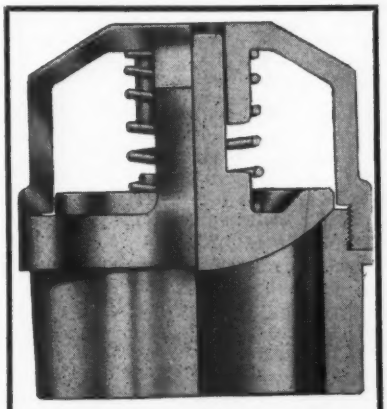
One serious problem, which was anticipated and consequently has been prevented so far, is the possible washout of large sections of the line. The California section crosses two areas where such washouts might occur. These are the Badlands near Beaumont, Calif., and the Chino Hills east of Los Angeles. In each of these areas rainfall is heavy during the rainy season and large quantities of water flow across the surface of the ground. Since the backfill above the pipe is soft, it is possible for the water to follow the backfill, removing the earth, and then wash or float out a large section of the pipe. This situation was recognized during construction of the line, however, and water ways were cut across the backfill at intervals to guide the water across and away from the loose earth. This foresight has prevented washouts so far, but the rainy season last year was unusually light and the water ways have not yet undergone a maximum runoff test. Operators of the line, however, feel that the water ways have been constructed in such a manner that they will handle the runoff during the heaviest rainfalls that can be anticipated from past experience.

First test to which the line was subjected following its completion was a maximum-pressure-standup test of 8 to 10 hours duration. In order to make this test, and for future operation, the line was divided into four separate pressure-range sections by pressure-limiting stations located at Shaver Summitt, Whitewater, and Olinda, Calif. Maximum operating pressures in these various sections are: Colorado River to Shaver Summitt pressure-limiting station, 807 psig.; Shaver Summitt station to Whitewater station, 725 psig.; Whitewater station to Olinda, 655 psig.; and Olinda station to Los Angeles (the line actually ties into the existing network of natural gas lines on the Pacific Coast at Santa Fe Springs), 500 psig.

Riddle Buys & Sells
PIPE

FOR SALE:
2" Straight Tubing.
Range 1. Lapweld.
No. 1 condition.
Delivered in
carload lots
Texas or Oklahoma
at 50¢ per ft.
Immediate Delivery.

WRITE, WIRE OR PHONE
RIDDLE OIL CO.
59 EAST VAN BUREN ST.
CHICAGO, ILL.
OR
SEGUIN, TEXAS



L-K ALL METAL CAGE TYPE PUMP VALVE

For those desiring an all metal pump valve, we believe that the L-K ALL METAL is superior to any in use. It has now been in successful pipe line operation for more than eight years without any replacement or repairs.

This valve offers the following advantages:

FULL SEAT OPENING, insures full capacity with less fluid velocity.
SPRING CONTROLLED, is closed by spring pressure instead of being pounded by fluid pressure.
CAGE TYPE, (friction locked) insures uniform lift and proper guiding.
LIGHT WEIGHT, no cumbersome wing guides to obstruct flow of fluid.
MATERIAL, hardened and ground alloy steel valve and seat, also stainless or monel.

L-K
PUMP VALVE CO.
P. O. Box 901 Houston 1, Texas

Remote-Control Power Tongs, Pipe Racker Take the SWEAT Out of Round Trips

by Leigh S. McCaslin, Jr.

EQUIPMENT which is currently being field tested on the Texas Gulf Coast will take the "sweat" out of round trips on the drilling rig.

Described by its originators as "remote-control power tongs and pipe racker," the equipment is a radical innovation in the drilling field. It practically eliminates the physical effort presently involved in making round trips. The derrick man and a floorman control this eqiupment from comfortable seated positions by merely manipulating control handles. The only manual labor involved is unlatching the elevators. Even this hand operation will be eliminated when automatic elevators, now under construction, are completed.

Although the speed of pulling one stand with the new equipment is only a little greater than is possible with conventional hand operation, this speed can be maintained indefinitely regardless of hole depth. On the other hand, fatigue slows crews during long trips made in the conventional manner.

The remote-control power tongs and pipe racker do not necessitate an increase in the size of the drilling crew. Also, no difficulty has been experienced on the test rig in familiarizing crew members with the operation of the equipment.

Initial arrangements were complete and work begun on the tongs and pipe racker in September 1945. Field operating tests were begun on April 28 of this year and two 10,000-ft. holes have been drilled. Based on these tests, a new improved model of the equipment is now being designed. As finally evolved, the equipment is a joint development of Humble Oil & Refining Co. and Byron Jackson Co. of Los Angeles.

Description of Pipe Racker

The equipment can best be described by discussing separately its two major component parts—the pipe racker and the power tongs. The remote-control pipe racker consists of two electrically operated "arms," one at the monkey board and one on the first girth on the ladder side of the derrick. The arms grip the pipe and move it to the desired spot on an elevated pipe platform when coming out of the hole, and pick it up from the platform and carry it to the power tongs when going in the hole.

The upper arm is operated by the derrick man on the monkey board and the lower arm by the tong operator on the floor. Each arm is controlled by a single control handle similar to an aircraft "joy stick" which is tilted in the direction of desired motion. Simultaneous motion in two directions is possible, permitting quick movement to any spot within the operating area. A trigger mounted on the control handle releases the grip on the pipe as desired.

The racker arms are actually 3-in. lead screws, similar to those used on lathes and other feeding machines, which are moved by belt-driven nuts. The 12-ft. racker arms, powered by 3-hp., 220-volt, a.c., 3-phase electric motors reach 10 ft. out across the derrick. (Keyways in the arm permit it to move without rotation as the nut drives it.) A stationary lead screw mounted on the derrick gives lateral motion along the side of the derrick when a second nut rotates about it. A 2-hp., 220-volt, a.c., 3-phase electric motor drives this nut. Limit switches prevent fouling the nuts.

The propulsion units—lower and upper—are identical, except that the monkey board moves along the side of the derrick with the upper racking unit. Each racking unit travels on a track consisting of 4-in. pipe reinforced with welded guide strips, allowing 8 ft. travel for the monkey board and 10 ft. for the lower racking arm. Control circuits are 110 volts a.c.

On the end of the upper arm is a claw which grips the pipe on contact and is released by the control-handle trigger. The "finger" of the claw is operated hydraulically by a solenoid valve. No weight is supported by the upper arm, and a safety shear pin permits the "hand" to rotate downward and release the grip should the arm become overweighted.

The lower arm grip or hand incorporates an auxiliary elevator for lifting the stand out of the tongs and off the pipe platform. A parallelogram linkage on the end of the arm permits a maximum travel of 10 in. vertically, as the arm remains in the same plane. This elevator is actuated by a push-button-controlled hydraulic cylinder mounted just under the monkey board and connected to the lower arm by a ⅜-in. wire line. The elevator is designed to support a 90-ft. stand of 5-in. E.U.I.F. drill pipe weighing approximately 2,000 lb.

Drill pipe is racked on a special steel platform on the ladder side of the rotary. The platform is 5.2 ft. above the floor and 4.6 ft. above the rotary. Currently the pipe is racked in a hayrake and fingers, normally racking 4 rows of 13 stands, 2 rows of 10, 2 rows of 8, and 1 row of 6 stands. Sixteen thousand feet of pipe can be handled.

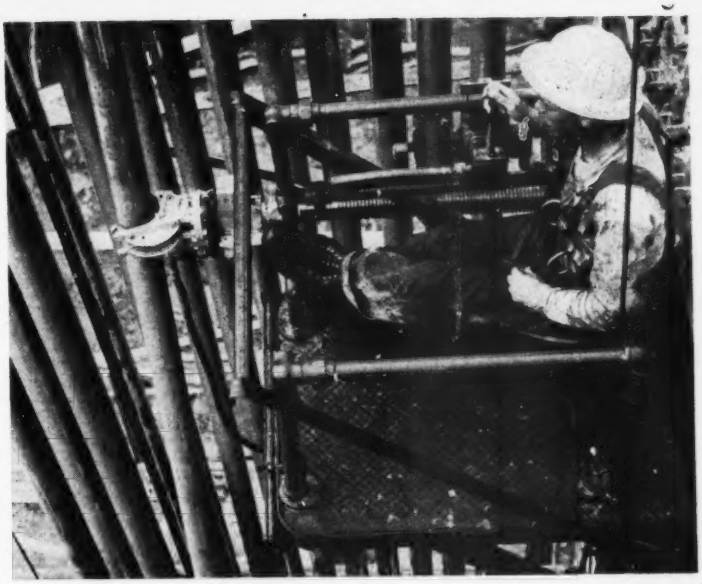
The monkey board is mounted on the upper racking unit, and travels laterally across the ladder side of the derrick. The board is equipped with a seat and handrails, the control handle and safety cutoff switch being located on the right handrail. The upper racking arm moves side to side with the monkey board, and the 10-ft. travel of the arm provides ample room to insure automatic latching of the elevators. (When manual racking is necessary, a 1-ft. extension on the monkey board is raised in place, and the front handrail drops down to reinforce the extension.)

For winter weather, the ultimate in comfort is being planned for the derrick man. Plans have been developed to enclose the monkey board with a lucite canopy and to provide heat if necessary. The fact that the derrick man does not have to reach out to manhandle the pipe makes such a canopy possible.

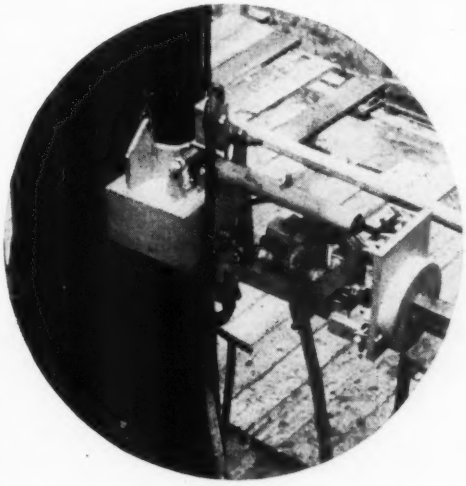
Description of Tongs

Manual handling of tongs has been eliminated by the remote-control power tongs—the second major component of the remote-control power tongs and pipe racker. These hydraulically powered tongs can run 2⅞-in. drill pipe to 8-in. drill collars without adjustment. They will make up, break

A previous article in The Oil and Gas Journal of August 5 described the "test" rig on which this automatic equipment is installed and gave some details concerning it. This present article is designed to present more details for drilling contractors and others concerned with such equipment. In particular, it emphasizes the operation of the remote-control power tongs and pipe racker.

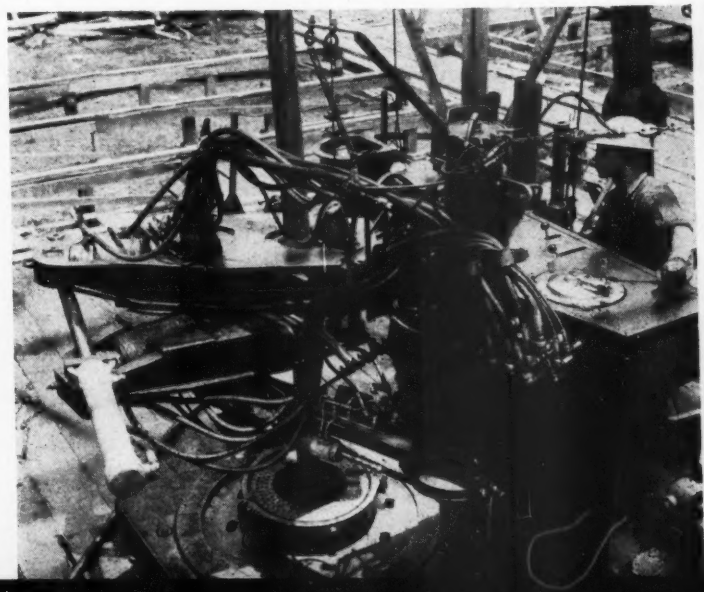


Upper racking arm: Stands of drill pipe are racked on the derrick by the upper racking arm, which moves in the direction that control handle in derrick man's hand is tilted. The monkey board moves from side to side with the racking arm



Lower racking arm: The drill pipe is lifted from the tongs or pipe platform by the "hand" on the lower racking arm, supported by the line reaching to the hydraulic cylinder just below the monkey board. Movement of the lower racking arm is controlled by the tong operator

Hydraulic power tongs: Drill pipe and casing is made up or broken out via the power tongs, by the operator seated at the tong control panel



How to make "thieves" come clean!

OVER a 12-month period the washing of thieves can run into a tidy sum considering that some refineries use as many as five thousand thieves a day.

If your bottle-washing runs anywhere near that number, it will surely pay you to investigate the possibility of building your own mechanical washer.

The Oakite layout (now being used successfully by many refineries) calls for a simple set-up of two steel tanks; a circulating pump and a spray chamber. One tank contains an Oakite alkaline-type cleaning solution. The other tank contains a mixture of Oakite solvent-type cleaner and kerosene or other distillate.

Lightly soiled thieves pass through the alkaline spray only and are thoroughly washed inside and out. Thieves having heavy oil or asphaltic deposits pass, first, through the Oakite solvent spray, then through the alkaline spray. They are then hot-water rinsed and allowed to dry down of their own heat. Both solutions return to tanks for re-use.

If you feel your bottle-washing output justifies a layout of this kind, write for construction data. Supplying specifications for simple equipment construction, to speed up and simplify cleaning procedures, is only one of the many free services offered by Oakite. Why not make use of this one today?

OAKITE PRODUCTS, INC.,
44G Thames St.,
NEW YORK 6, N. Y.

OAKITE
MATERIALS
METHODS
SERVICE

Specialized Industrial Cleaning

Technical Service Representatives in Principal Cities of U. S. & Canada

Expanding

to give you better service

About June 1st we hope to be in our new, modern building at 520-526 North Main in Tulsa. A building dedicated to a faster and more efficient Electrical Supply service for you.

When it's Electrical

NELSON

ELECTRIC SUPPLY CO.

TULSA, Detroit & Cameron

out, spin up, and spin out any size pipe in that range with equal ease. The tong operator faces the driller as he controls these operations with eight hydraulic valves mounted in the tong control box.

The power tongs, operator's seat, and control box are mounted on a 6-in. column 4 ft. from the center of the rotary on the draw-works side. The supporting column is bolted to the substructure and guyed to the derrick at the top. A hydraulic lift built into the column provides a 3-ft. vertical travel of the entire unit, permitting operation at any height in that range and allowing driller leeway in setting the slips.

The tongs are in two frames, with the upper frame mounted to rotate 30° about the drill pipe center for maximum tonging. The two tong frames rotate together 180° about the supporting column on a 4-in. pipe arm. All operation is hydraulic, utilizing eight hydraulic cylinders and one hydraulic motor to latch and unlatch the tongs, grip and spin the pipe, and carry it. The hydraulic motor develops 8,800 lb.-in. torque and spins the knurled rollers at 80 r.p.m. for spinning the pipe in either direction. A force of 15,000 lb. is used against the rollers for spinning.

Maximum breakout torque is 1,600,000 lb.-in. and maximum make-up torque is 800,000 lb.-in. Normal operating pressure is 1,500 psi., although 2,500 psi. is used for maximum torque.

Operation of the Equipment

The derrick man, on the powered monkey board, controls the upper racking arm from a seated position. All movement of the drill pipe up in the derrick is by the racking arm. The derrick man's only manual operating is to unlatch the elevators when coming out of the hole.

All tonging operations and pipe handling on the derrick flow are remotely operated by the tong operator from a seated position. He controls each individual operation with his eight control valves and his racker control handle.

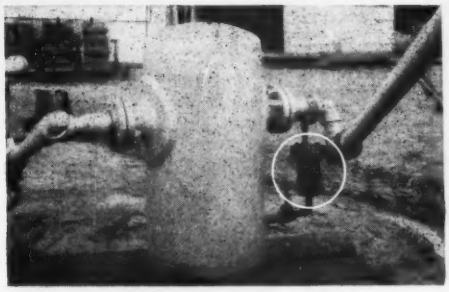
The driller operates the drilling engine, brakes, and slips. The rotary helper on the floor only latches and unlatches the elevators and washes the drill pipe.

Coming Out of the Hole

The operations involved in coming out of the hole can be described as follows: As soon as the driller sets the air slips after pulling a stand of drill pipe, the tong operator moves the tongs to the pipe at the proper height, and latches the tongs. The tong operator sets the grip, and the upper frame rotates 30° to break out the connection. The grip is released, the upper jaw takes the carrying grip, and the lower jaw is unlatched. The tongs lift the stands as the driller spins the joint out with the rotary. (The spinning may be done with the

One of a series featuring specific applications of Armstrong Traps in the oil field and the refinery.

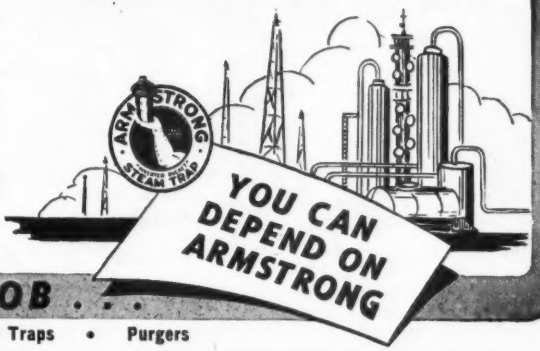
HOW TO GET *Dependable* CONDENSATE DRAINAGE OF STEAM DRILLING RIGS . . .



With cap and body of high tensile strength die forgings and interior mechanism of stainless steel, Armstrong Forged Steel Steam Traps offer the extra margin of safety and dependability desirable for trapping steam drilling rigs. For most rigs the No. 313 trap is recommended. It is good for pressure to 600 psi. and provides the same advantages as all Armstrong Traps—simple operation . . . ability to handle ordinary dirt conditions . . . freedom from air binding . . . tight closing, wide opening valve for efficient condensate removal with no steam loss. Write for complete details and catalog.

ARMSTRONG MACHINE WORKS
868 Maple St. Three Rivers, Mich.

USE *ARMSTRONG* FORGED STEEL TRAPS



IF IT'S A TRAPPING JOB . . .

Steam Traps • Air Traps • Gasoline/Water Traps • Purgers

OPPORTUNITY FOR

Experienced Oil Field Service Personnel

Field Superintendents
Sales Engineers
Perforator Operators

Outstanding opportunities to become associated with a young and progressive organization which pioneered the development of the jet process of casing perforation and other applications of the jet method. Welex Jet Services, Inc., is the owner and licensor of these processes throughout the world. We are now expanding our field service division and are opening several new stations to better serve the oil industry.

Applications for employment from qualified oil field personnel are solicited. Those accepted will enjoy the security of key positions now and rapid advancement in our expanding field service division.

Write or phone Welex Jet Services, Inc., 3909 Hemphill St. (Phone 4-3247), Fort Worth 9, Texas.

This is a
MARMAN PATCHMASTER
It Stops Pipe Leaks up to 1100 P.S.I.

Quickly
Cheaply
Permanently

FEATURES: Stainless steel for strength, corrosion resistance, permanent repairs. • Hycar pad resistant to deterioration by hot or cold water, gas, oil, etc. • Can be used and re-used—outlasts pipe. • Easily and quickly installed by one person. • Forms naturally to pipe contour—no loose parts. • Adjustable—4 sizes for all pipe up to 4".

For information write

MARMAN PRODUCTS CO. INC.
940 W. REDONDO BOULEVARD
INGLEWOOD, CALIFORNIA

O-10

WHEN Firth-Vickers of England signed their reciprocal agreement with Lebanon of U. S. A. for a complete exchange of ideas, information and foundry practices, it meant a lot to you.

For now you can have the advantage of the best in alloy castings which has been developed *both* in this country and in Europe.

Of great importance is the "centri-die" process of making centrifugal castings in permanent molds. Firth-Vickers developed this process to make possible the Rolls Royce, De Havilland and other jet engines. Here at Lebanon we are finding applications not only for airplane engines but also in equipment for the oil, chemical, paper and pulp, mining and other industries where corrosion and heat make service conditions severe.

When you talk to Lebanon about alloy castings you *know* you are talking to experts with a wealth of information available.

LEBANON STEEL FOUNDRY · LEBANON, PA.

"In The Lebanon Valley"

The Agreement between Firth-Vickers Stainless Steels, Ltd., Sheffield, England and the Lebanon Steel Foundry, Lebanon, Pa., U.S.A. provides for complete exchange of metallurgical and engineering data, and foundry techniques and practices. This understanding between Lebanon and the largest producer of alloy castings in Europe pools the technical knowledge and experience of both sides of the Atlantic for your benefit.

Write now for this FREE BOOKLET "Centri-die Centrifugal Castings"

Here is a clear explanation of the practical advantages to you of the Firth-Vickers Centri-die method of making alloy castings centrifugally in permanent molds. Of interest to executives and engineers who want to keep abreast of new manufacturing and production methods. Write for Bulletin K.

LEBANON ALLOY AND STEEL Castings

CIRCLE L

tong rollers, although rotary spinning is faster and relieves the tong operator of an operation.)

While the breaking-out operation is under way, the derrick man pulls the stand to him by means of his powered hook and manually unlatches the elevators. As soon as the threads clear the tool joint, the stand is carried to the transfer position through a 51° arc by the upper frame. (Both frames move together. This transfer position, approximately 4 ft. from the rotary, is necessary to allow clearance for the traveling block.)

At the transfer position, the lower racking arm, under the control of the tong operator, grips the pipe automatically on contact, lifts the stand from the tong frame, and racks the stand in its proper place. The stand is carried with about 2 in. clearance above the pipe platform, and the drop to the platform is easy as the grip-release trigger is pulled. A push-button automatically returns the racker to the transfer position. The derrick man racks the upper end of the stand simultaneously with the lower end. The driller lowers the block as soon as the derrick man unlatches the elevators, and the rotary helper latches the elevators on the pipe in the rotary.

Going in the Hole

Going in the hole consists of the following operations: First both racking arms pick up a stand and move it to the transfer position. (The auxiliary elevator on the lower racker arm supports the weight of the stand from the hydraulic cylinder mounted on the derrick.) The derrick man centers the monkey board and holds the pipe clear of the block. At the transfer position the auxiliary elevator lowers the stand into the upper tong frame, which grips the tool joint. The tong operator then swings the tongs around and stabs the stand into the joint in the slips. The lower jaw is latched and the stand is screwed up by the spinning motor, after which both jaws grip the pipe. The upper frame then rotates 30° to provide final tightening. (This is sometimes repeated as required to produce a tight connection.)

While the tonging is in progress, the derrick man moves the upper end of the stand into the automatically latching elevators. Tonging complete, the driller picks up to free the air slips, and lowers the pipe into the hole. By the time the pipe is lowered into the hole, the slips set by the driller, and the elevators unlatched by the rotary helper, the tong operator and derrick man have moved the next stand into the transfer position, and await the ascending block to clear the stand before repeating the process. By contrast with conventional operation, the block is run up and stopped before the pipe is pushed into the elevators by the upper racking arm.

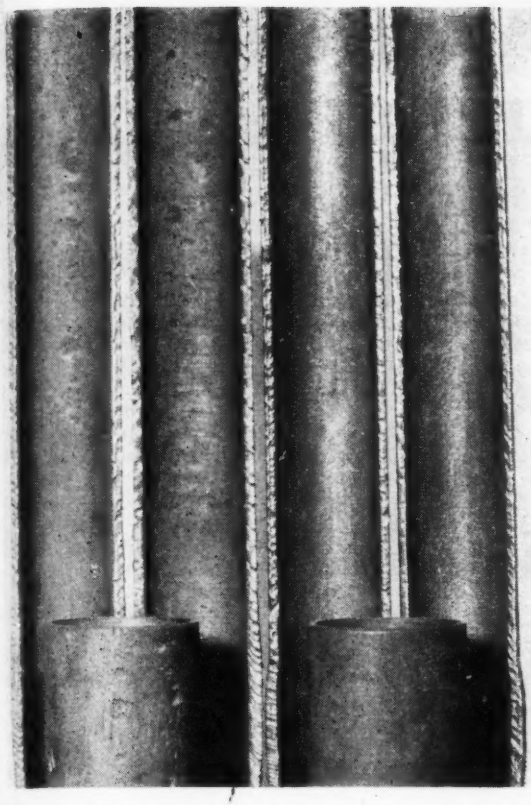


Fig. 5: Interior surface of new sandblasted test joints after 12 weeks' exposure in well 5: left joint and coupling, no treatment: right joint and coupling, treatment with Kontol 116

Organic Inhibitors

(Continued from page 79)

pullings is of prime interest to the producer. The pulling history of the six wells is therefore given in some detail in Table 6.

Except for wells 1 and 2, treatment was started with no preparation of the well subsurface equipment. The tabulated reduction in frequency of well pullings due to corrosion was obtained with existing equipment not culled for bad joints of tubing or rods, or for worn or corroded pump parts. (New rod and tubing strings were run in wells 1 and 2 in order to insure a 12-week test of tubing and rod subs not invalidated by pullings).

In addition it should be noted that since treatment was started as much as 18 months ago, there have been no shutdowns due to punctured tubing or pitted rods. All of the well pullings which were considered as caused by corrosion were due to failure of pump parts, such as pump tubes, balls and seats, or cups, where erosion and wear aggravate the condition.

The economic importance of a successful means of combating oil well corrosion can hardly be overemphasized. In many fields, corrosion costs constitute one of the principal expenses of production. Furthermore, the present crude-oil market has caused the return of many marginal wells to production. The prohibitively high operating costs of these wells was in many cases due to corrosion. Protected, at a few cents per barrel of production, from the frequent pulling, replacement, labor and lost production charges against them, these wells can again be operated at a good profit.

With the present shortage and cost of steel, it becomes particularly essential that tubing, casing, and flowline pipe be protected to the utmost. Compared with the very high initial cost of high-alloy rods or plastic-covered tubing and rods, there is little expense involved in establishing protection with Kontol. No special equipment is needed for treatment by batch dumping, and if chemical pump injection is desired, the cost is nominal.

Aside from the general conclusion that treatment of corrosive wells with Kontols 116 or 118 effected a great saving from a reduction in pulling costs, a more detailed cost accounting was made on well 4 by the engineer in charge. This accounting is presented in Table 7, and represents the expense involved in producing well 4 due to corrosion of subsurface equipment only.

It is apparent that treatment of this well with Kontol 118 reduced the total operating cost due to corrosion from 46½ cents a barrel to a little over 3 cents a barrel, with no preparation of the subsurface equipment made before starting treatment. In contrast, treatment of this well with another, widely known, inhibitor effected little or no reduction in corrosion costs, not withstanding the culling out of corroded tubing and rods in preparation for the test. The use of an insulated flange in the flow line between October 22, 1946, and January 1, 1948, had no apparent effect on the corrosion in this well, either during the period of no treatment, or while using Kontol 118.

The use of Kontol 116 or 118 should result in further savings due to the protection of surface flow lines, and after continued use this protection should extend even so far as to include the field tanks.

Summary and General Conclusions

As a result of the 18 months of test work described in detail in this paper, the corrosion-preventive abilities and limitations of the different Kontols were made apparent. It was soon found that Kontols 116 and 118 were very effective in inhibiting corrosion

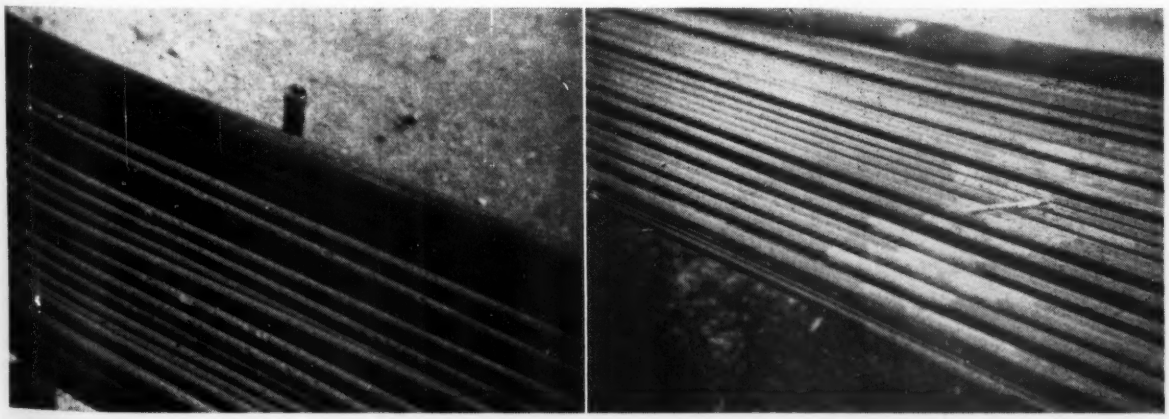


Fig. 6: Comparison of the rod string from untreated well 2 with the string from well 1 treated with Kontol 116 for 6 months

TABLE 7—SUBSURFACE CORROSION COST ANALYSIS, WELL 4. (WELL COMPLETED DECEMBER 16, 1944)

Period—	No. of days	Rod jobs No.	Rod jobs Cost	Tubing jobs No.	Tubing jobs Cost	Pump costs	Labor costs	Chem. costs	Total costs	Prod. bbl.	Cost (day)	Cost (bbl.)	Remarks
9-2-45 to 5-8-46	246	2	0.00	1	79.00	56.00	276.00	0.00	411.00	4,403	1.66	0.093	No chemical used. New tubing run in on 9-2-45.
5-8-46 to 7-22-46	75	1	217.50	1	116.50	28.00	210.00	0.00	572.00	742	7.64	0.772	Cost not representative due to preparation for test of other inhibitor.
7-22-46 to 10-10-46	80	0	165.00	1	11.50	28.00	144.00	38.50	387.00	587	4.84	0.658	Injected other inhibitor at approx. 1 qt./day.
10-10-46 to 4-30-47	202	2	75.00	3	120.00	42.00	531.00	0.00	768.00	1,653	3.80	0.465	No chemical used. Well insulated from flow line 10-22-46 to 1-1-48.
4-30-47 to 1-2-48	248	*1	0.00	0	0.00	5.00	33.00	62.50	100.50	3,129	0.406	0.032	Injected Kontol 118 at 1/2,500 and then 1/5,000 ratio.

*Only 50 per cent chargeable against corrosion (outer pump tube scored and pitted). Only pulling jobs due to corrosion recorded in this table.

due to sour crudes. However, Kontols 110 and 115 were effective only to a limited degree, although they have proved very effective in preventing distillate-well corrosion. It was further concluded that a safe minimum rate of daily treatment was 1 pt. per day, although wells have been successfully treated at lower rates.

It was found that the subsurface equipment of wells treated with Kontols 116 or 118, when pulled and stacked, exhibited a smooth oily surface which remained in that condition during the period of stacking. Consequently they were protected to some extent from atmospheric corrosion before being run back in the well. The contrast of the appearance of the oily surfaces of protected rods with the dry, crystalline surfaces of rods from an untreated well is graphically illustrated in Fig. 6.

The unprotected pitted rods had been in operation in well 2 for over 24 months before the picture was taken, while the protected rods had been in well 1 for 6 months when photographed. The first stages of corrosion had not yet taken place on these rods.

Other conclusions of interest are as follows:

1. Although desirable, no preparation of the subsurface well equipment is necessary before starting treatment with Kontol corrosion preventives.

2. The protection of the Kontol film lingers in gradually diminishing effect for several weeks after treatment is stopped. This assures good protection (after the film has been established) even though the daily or triweekly dosage of Kontol is missed occasionally.

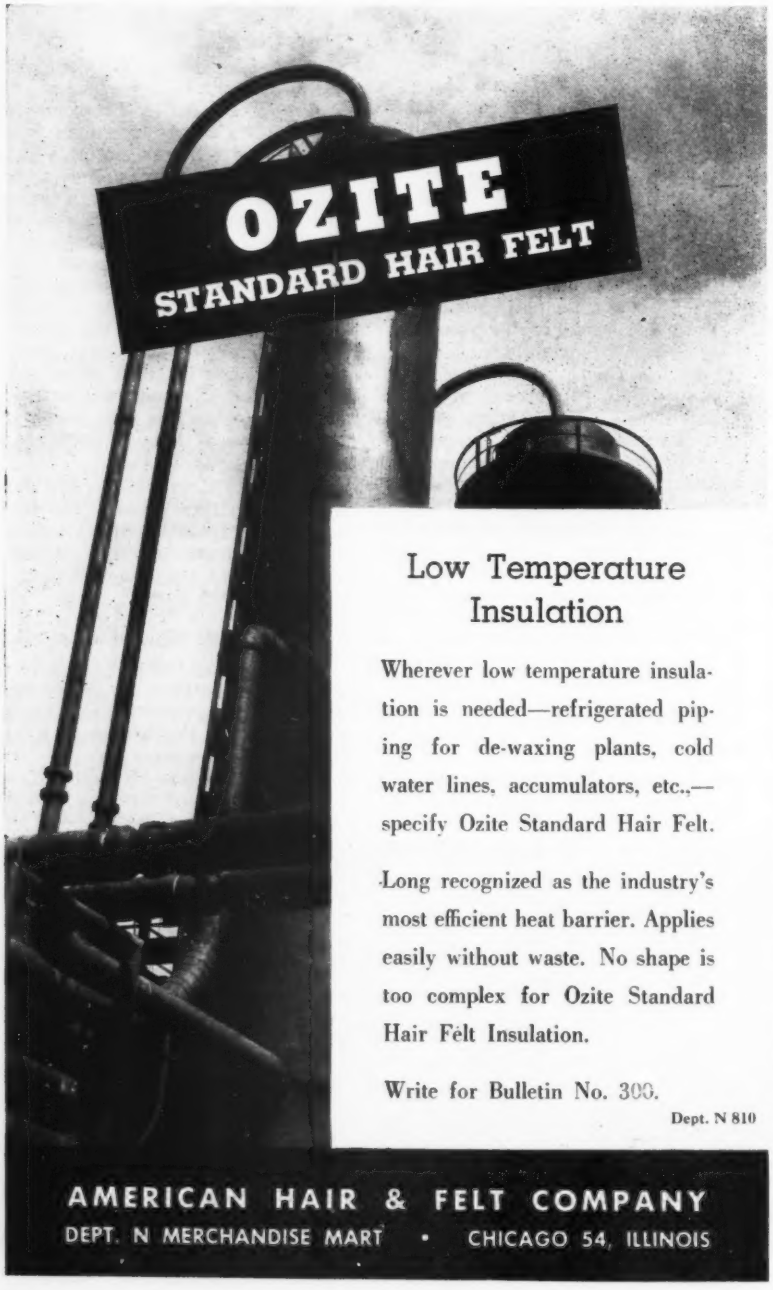
3. The physical characteristics of the Kontols allow treatment by means of chemical proportioning pumps, by daily or triweekly batch dumping, or, where preferred, by drip lubrication.

4. It was noted that polished rods brightened up and paraffin deposition on the coupons greatly decreased soon after treatment with Kontol was started.

5. Kontols 116 and 118 eliminate all tendency toward pitting. Any residual corrosion is evenly distributed over the entire surface.

6. The effective use of Kontols is not limited by the amount of hydrogen sulfide produced by the wells. Likewise, the amount of brine produced has little effect where brine/oil ratios are around 10/1 or less. Wells producing larger quantities of brine may require a somewhat greater rate of treatment for full protection.

7. The importance of first establishing the protective film at relatively high (1/2,500) treating rates was clearly indicated.


OZITE
STANDARD HAIR FELT
Low Temperature Insulation
Wherever low temperature insulation is needed—refrigerated piping for de-waxing plants, cold water lines, accumulators, etc.,—specify Ozite Standard Hair Felt.
Long recognized as the industry's most efficient heat barrier. Applies easily without waste. No shape is too complex for Ozite Standard Hair Felt Insulation.
Write for Bulletin No. 300.
Dept. N 810
AMERICAN HAIR & FELT COMPANY
DEPT. N MERCHANDISE MART • CHICAGO 54, ILLINOIS

ENGINEERING *fundamentals*

Internal-Gas-Drive Reservoir

FACTORS that control the performance to be discussed are the physical characteristics of the reservoir fluids, including gas solubility, formation volume factor and viscosity, the connate-water saturation of the reservoir, and the flow characteristics of the reservoir material. Usually a change in no one of these factors will occur independently of a change in some other so that the over-all effect on performance will be a combination of the roles played by each.

Fig. 1 is a typical set of performance curves for an internal-gas-drive reservoir. The pressure decline does not follow a simple relationship and is contrary to any simple expression such as a logarithmic plot. The rate of pressure decline is governed by those factors which affect the gas-oil ratio and cumulative production.

The total cumulative oil production may vary from a low of less than 10 per cent of the initial stock-tank oil in place to a maximum in the neighborhood of 30 to 40 per cent of the initial stock-tank oil in place. A generally accepted rule of thumb for recovery by internal gas drive has been 30 per cent of the stock-tank oil in place. Muskat and Taylor[1] have demonstrated that a more reliable rule of thumb for general approximation would be the use of 30 per cent as a measure of the ultimate space voidage after internal gas drive. The stock-tank cumulative can then be estimated by use of this figure and the original formation volume factor.

The key to the performance of an internal-gas-drive reservoir is the gas-oil ratio. Inasmuch as the energy for oil displacement is the gas in solution, the greater the production of that gas the more rapid is the loss of producing energy. To put this statement in a quantitative manner, the area under the gas-oil ratio curve in Fig. 1 is equal to the total gas produced, which quantity at the termination of production must be equivalent to the total gas which was available. Since only a definite amount of gas is available it follows that the higher the gas-oil ratios during the producing history the less must be the cumulative production.

It follows, all other things being equal, the greater the amount of gas in solution the greater the cumulative recovery because the area under the gas-oil-ratio curve is increased. However, with greater amounts of gas in solution all other things will not be equal. In general, the greater the amount of gas in solution, the greater will be the shrinkage of reservoir oil upon production (i.e., the greater the formation volume factor). This means a greater space voidage in the reservoir and a consequent greater gas-oil ratio for a given cumulative. Hence, the effects of increased solution gas and increased formation volume factors tend to balance one another in so far as they contribute to a change in ultimate recovery.

Further contributing factors can be outlined by a consideration of the gas-oil-ratio equation:

$$R = \frac{k_g}{k_o}\,\frac{u_o}{u_g}\,\frac{\beta}{v} + r \qquad (1)$$

For a given reservoir-oil saturation (constant k_g/k_o) and a given reservoir pressure, the gas-oil ratio is directly proportional to the reservoir-oil viscosity. Thus, a more viscous oil will be produced at a given reservoir condition at a higher gas-oil ratio than will a less viscous oil. Since a given reservoir-oil saturation means a given cumulative production, the higher the reservoir-oil viscosity the greater will be the area under the gas-oil-ratio curve for a given cumulative. Hence, a lower cumulative will exist at the termination of production for viscous oils on the basis of a given amount of gas being available for any viscosity oil. Thus, for a 10° A.P.I. oil (viscous, small amount of gas, low shrinkage) Muskat[2] calculates a recovery of approximately 9 per cent of the pore space and for a 40°-A.P.I. oil (less viscous, greater amount of gas, greater shrinkage) he calculates a recovery of approximately 16 per cent of the pore space.

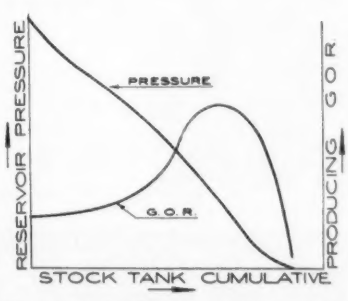


Fig. 1—Typical performance curves for an internal-gas-drive reservoir

From the equation for R can also be noted the effect of an increased value of β. For a given reservoir-oil saturation, the greater β, the greater is producing gas-oil ratio.

Another factor to be considered is the relative permeability ratio k_g/k_o. In those reservoir materials where this ratio is high at a given reservoir oil saturation the gas-oil ratio will be high and hence the ultimate cumulative recovery low.

The effect of the amount of connate water on the performance of an internal-gas-drive reservoir is indirect. It gives a change to the reservoir performance primarily because it occupies space which might be occupied by residual oil, yet it does not change the relative-permeability ratio to any marked extent, and it does not have the shrinkage attendant to the oil which it replaces within the reservoir pores.

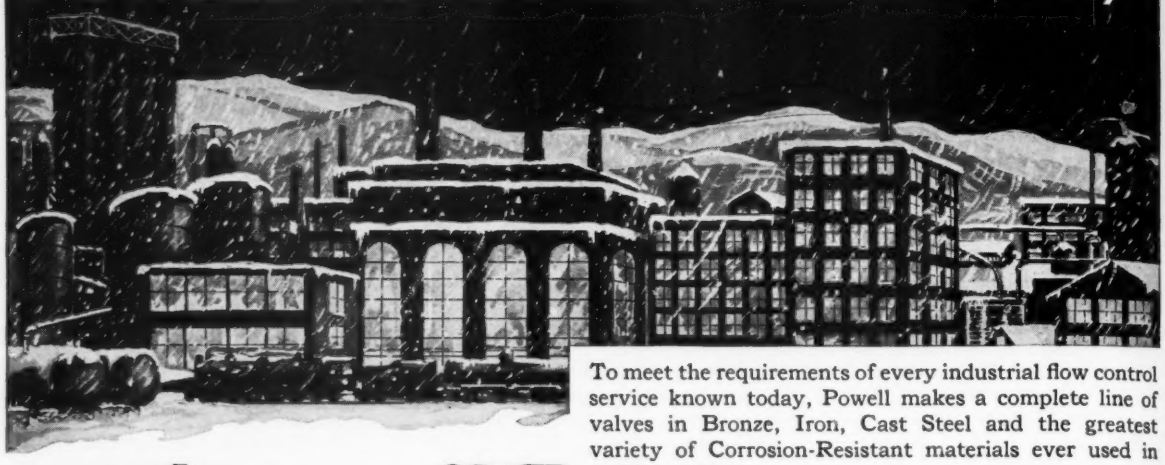
Consider the void space in the reservoir caused by withdrawal of a certain volume of stock-tank oil in two different cases, one which has no connate water and one which has connate water, but in both cases the pore volume is the same. The void space left is not only that due to oil removed but also that due to shrinkage of oil remaining in the pores. Where there is no connate water, there will be a greater total shrinkage of the oil left and more space voidage. More space voidage in turn means a higher k_g/k_o and a higher gas-oil ratio. Thus, the gas-oil-ratio curve will go higher and there must be a lower ultimate recovery. This analysis must be modified when sufficient water is present to change the k_g/k_o curve appreciably.

References

1. Muskat and Taylor, A.I.M.E. Trans. Vol. 165 (1946) p. 78-93.
2. Muskat and Taylor, The Petroleum Engineer, December 1946.

Series by Dr. John C. Calhoun, Jr., Chairman, Petroleum Engineering School, University of Oklahoma

POWELL VALVES cover all Industry



To meet the requirements of every industrial flow control service known today, Powell makes a complete line of valves in Bronze, Iron, Cast Steel and the greatest variety of Corrosion-Resistant materials ever used in making valves.

We cannot introduce "Powell Valves for Corrosion Resistance" as a *new* feature, because with us they are long past the introductory stage. In fact it was more than 25 years ago that the Powell Special Design and Alloy Valve Division was established.

But we *can* feature the fact that today Powell makes the only *complete line* of Corrosion-Resistant Valves available to the Chemical and Process Industries.

Fig. 460—Iron Body Bronze Mounted "Pilot" Gate Valve with bolted bonnet, screwed ends, inside screw rising stem and tapered wedge, solid or double. ➔

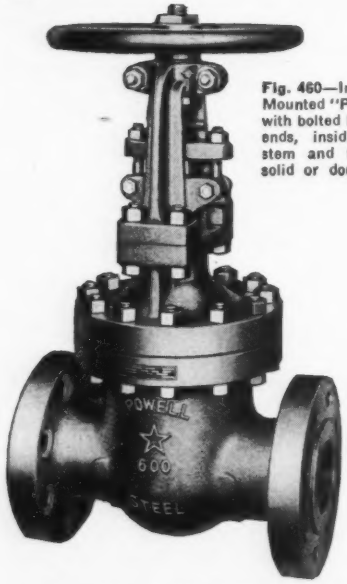


Fig. 6003—Class 600-pound Cast Steel Gate Valve with flanged ends, outside screw rising stem, bolted flanged yoke and tapered solid wedge.

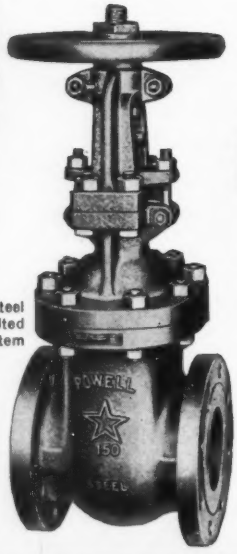


Fig. 1503—Class 150-pound Cast Steel Gate Valve with flanged ends, bolted flanged yoke, outside screw rising stem and tapered solid wedge.

For full information on applications of Powell Corrosion-Resistant Valves, refer to Powell Catalog No. 242. If you do not have it, write, on company stationery, for your copy NOW!

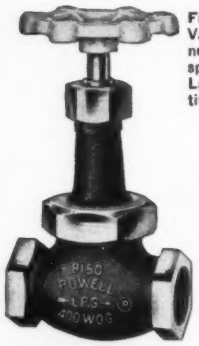


Fig. 8150—Bronze L. P. G. Globe Valve with screwed ends, union bonnet and special composition disc. Inspected and listed by Underwriters' Laboratories', Inc. Write for descriptive circular—8-48B.

Fig. 1444—125-pound Iron Body Bronze Mounted Gate Valve with outside screw rising stem, bolted flanged yoke and tapered wedge. ➔

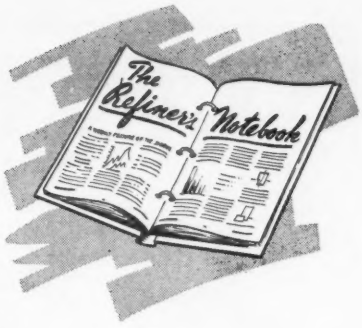
Fig. 190—150-pound Iron Body Bronze Mounted "Irenew" Globe Valve. Has screwed ends, union bonnet and regrindable, renewable wear-resisting "Powellium" nickel-bronze seat and disc. ➔

The Wm. Powell Co., Cincinnati 22, Ohio

DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

POWELL VALVES

Cost-imating



A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

Exchangers

COST INDEXES,* 1946 = 100

	Exchangers	Refinery construction: Overall	Mat.	Labor
1924	...	78	87	60
1926	75	73	80	58
1928	75	72	78	57
1929	73	71	76	59
1930	73	65	68	57
1931	65	61	63	57
1932	60	56	60	48
1933	55	57	61	49
1934	60	59	62	55
1935	65	62	64	58
1936	70	64	66	60
1937	78	69	71	65
1938	74	67	67	67
1939	76	69	68	68
1940	78	70	70	69
1941	89	75	77	71
1942	99	80	80	79
1943	100	85	85	87
1944	94	86	85	90
1945	91	90	88	94
1946	100	100	100	100
1947	115	117	115	119
1948 est.	130	151	149	154

*Refiner's Notebook No. 1, October 21, 1948.

EXAMPLE.—A 630-sq.-ft. exchanger with an expansion ring in the shell, has brass tubes and sheets, and is to operate at 75 psig. in the shell. When correcting the basic 1946 cost for materials, etc., the square foot cost is:

3.50 × .94 × 1.24 × 1.05 = $4.29
4.29 × 1.30 × 630 = $3,510 in 1948

FACTORS FOR PRESSURE (and temperature)

		Ref.
75 psig.	0.94	1,2
150 psig.	1.0	...
300 psig.	1.07	1,2,6
400 psig.	1.18	2
600 psig.	1.46	2
Temp. 650°-900° F.	1.08	2

FACTORS FOR MATERIALS

Steel sheet and tubes	**1.0**
Admiralty tubes and Naval brass tube sheets[1,2,6,7]	1.13-1.35
18-8 tubes[1]	2.0-2.5
18-8 tubes-lined channel[1]	2.0-3.0
18-8 tubes-lined channel and clad shell[1]	4.0-6.0
18-8 shell alone[2]	8.0-9.0
4-6 chrome shell only[2]	4.0-6.0

FACTORS FOR TYPE OF CONSTRUCTION

Tubes, only[2]	0.06-0.27
Bundle, only[1]	0.3-0.6
Shell[2] (everything but tubes)	0.73-0.94
Fixed head[2]	0.70
Nonremovable bundle[1]	0.5-0.7
Clamp-ring construction[1]	0.9-1.0
Internal floating head	**1.0**
Expansion ring in shell[1]	1.0-1.1
External floating head[1]	1.1-1.2
Reboilers[1]	1.1-1.2
Vacuum (wide tube spacing)[3]	1.3-1.4
Tank heaters[3] (hairpin type-one head missing)	0.5-0.7

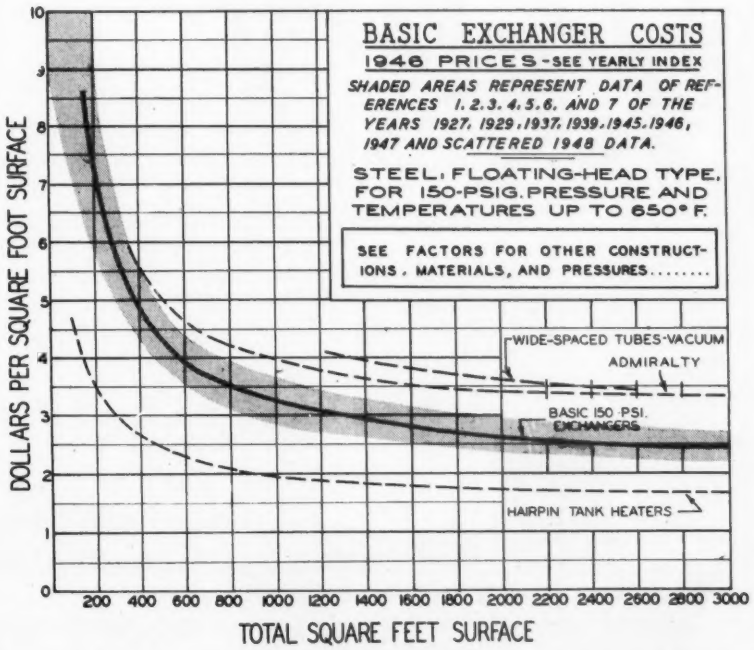
Tube length[8]—8 ft., 1.3; 12 ft., 1.1; **16 ft., 1.0;** 20 ft., 0.95

INSTALLATION COSTS

Per cent of material cost[1]	5-10
Per shell:[4]	
On ground, small	$100
On ground, large	$150
Condensers	$225
Insulation,[5] per sq. ft. of shell	$1.65
Foundations:	
Excavation—yd./M sq. ft.	4
Concrete—yd./M sq. ft.	2

References

1. Happel, Aries, and Borns, Chem. Eng., Oct. 1946, p. 99.
2. Bliss, H., Chem. Eng., May 1947, p. 126.
3. The author, costs files.
4. Ross Heater Co., 1927 data.
5. Vogt, H., Machinery Co., Bulletin HE-4.
6. Western Supply Co., Tulsa, Okla.
7. Rubin, F. L., A.I.Ch.E. meeting, Buffalo, Sept. 1947.
8. Sieder, E. N., Chem. & Met. Engr., 46, 332 (1939).


BASIC EXCHANGER COSTS
1946 PRICES - SEE YEARLY INDEX
SHADED AREAS REPRESENT DATA OF REFERENCES 1, 2, 3, 4, 5, 6, AND 7 OF THE YEARS 1927, 1929, 1937, 1939, 1945, 1946, 1947 AND SCATTERED 1948 DATA.
STEEL, FLOATING-HEAD TYPE, FOR 150-PSIG. PRESSURE AND TEMPERATURES UP TO 650° F.
SEE FACTORS FOR OTHER CONSTRUCTIONS, MATERIALS, AND PRESSURES.....
WIDE-SPACED TUBES-VACUUM ADMIRALTY
BASIC 150 PSI. EXCHANGERS
HAIRPIN TANK HEATERS
DOLLARS PER SQUARE FOOT SURFACE
TOTAL SQUARE FEET SURFACE
0
1
2
3
4
5
6
7
8
9
10
200 400 600 800 1000 1200 1400 1600 1800 2000 2200 2400 2600 2800 3000

No. 2 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

For Increased Leaded Octane Ratings—

PERCO CATALYTIC DESULFURIZATION

Perco Catalytic Desulfurization represents an easy, inexpensive solution to the problem of manufacturing higher octane motor fuel. If you are faced with the job of improving the quality of your product, a Perco engineer will give you further details about licensing this profitable process.

PHILLIPS PETROLEUM COMPANY

Phillips 66

PERCO PROCESSES

Chemical Products Department

BARTLESVILLE, OKLAHOMA

PROFIT WITH PERCO PROCESSES

REFINING

Petrol Refining to Build Two New Topping Units

Contract has been awarded to Rust Engineering Co. to design and build two crude-oil topping units with a combined capacity of 50,000 bbl. of crude oil daily for Petrol Refining, Inc., at its Texas City, Tex., refinery. The new units will produce a range of distillate products and reduced crude for charge to Petrol's existing Houdry catalytic cracking units.

Present crude-oil capacity of Petrol's refinery is 50,000 bbl. daily and a cracking capacity of 16,500 bbl. daily.

The two units are to be completed early next year. Equipment from the Beaumont, Tex., toluene plant which Petrol Refining purchased from the War Assets Administration is being used.

Petrol Refining, Inc., is the former Petrol Terminal Corp. Its present plant in Texas City was converted from high-octane facilities built during the war by the Government and subsequently purchased by the company.

East Coast Area to Have Better Fuel-Oil Supply

Distribution of fuel-oil supplies in northeastern United States should be considerably improved this winter due to the addition of storage facilities announced by three major suppliers of the area.

Socony-Vacuum Oil Co., Inc., has leased two new storage tanks with a combined capacity of more than 10,000,000 gal. at Groton, Conn., to assure supplies of home-heating oil tor Connecticut and Rhode Island. In addition, Socony is dredging dock facilities at the Groton distribution center, to a new depth of 35 ft. in order to accommodate their tankers, which will transport the home-heating oil from refineries in Texas.

Coastal Oil Co. has constructed three new storage tanks at its Port Newark terminal. The addition will boost Coastal's total storage capacity at the Newark terminal to about 52,000,000 gal.

Tide Water Associated Oil Co. will construct four 131,500-bbl. storage tanks for gasoline and heating oils.

STANDARD COMPLETES BARBER PURCHASE

Standard Oil Co. of California has exercised its option to purchase the minority interest in California Refining Co. held by Barber Oil Corp. California Refining operates a refinery at Perth Amboy, N. J., and will now become a wholly owned subsidiary of Standard Oil Co. of California. This aerial view shows the Barber refinery and in the background the concrete wharf which can accommodate three tankers simultaneously

EXCEL-SO

METER CALIBRATING TANKS

designed to API recommended specifications are available in capacities of: 50, 100, 200, 300, 500 and 750 gallons; and, 10, 15 and 20 barrels.

We will gladly make any changes in design to meet your particular requirement for either:

Atmospheric or High Pressure Provers

USE THIS COUPON

WARNER LEWIS COMPANY
BOX 3096J TULSA OKLAHOMA

Please send more information on Calibrating Tanks

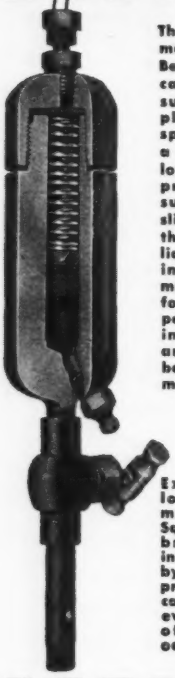
EXCEL-SO

Name _____

Street _____

City _____

new lubricator whips orifice meter bearing-shaft problems



The new Squier Automatic Orifice Meter Bearing-Shaft Lubricator utilizes pressure in the meter, plus a light coiled spring connected to a steel piston and low-friction cup, to provide a positive sustained pressure slightly in excess of the measured gas or liquid pressure. This increased pressure makes it impossible for gas or liquid to penetrate the bearing-shaft housing and lock or freeze bearing parts during meter operation.

Exclusive spring-loaded type design makes the new Squier Automatic Lubricator the only instrument available by which continuous pressure-lubrication can be maintained, even though a shut-off or back flow occurs in the line.

two-year research and field test* data:

One filling of the new Squier Automatic Lubricator affords perfect lubrication on new bearing-shafts for a period of eight to 16 months. Meters function as freely at 5000 p.s.i. as at very low pressures... Sustained maximum sensitivity always allows pen to return to normal position regardless of working conditions... Prevents erroneous zero recordings... Contamination and deterioration of the lubricant by highly volatile liquids is prevented. Expense and service of bearing-shaft and parts replacement is eliminated.

SQUIER AUTOMATIC
ORIFICE METER BEARING-SHAFT
LUBRICATOR

FREE DESCRIPTIVE LITERATURE
Write John P. Squier Co., Box 6100, Dallas, Texas, for complete operating details, prices, etc.

Conducted at the requests of major companies.

The tanks, which are scheduled for completion by this winter will be built on the 66.5-acre tract recently purchased by the company along the Kill van Kull waterfront. Also included in the company's modernization and expansion program is the revamping of the lubricating oil plant at the Bayonne, N. J., refinery, and the erection of 23 lube storage units.

McMurrey Sets On-Stream Record for Dubbs Unit

McMurrey Refining Co., Tyler, Tex., operating a 3,500-bbl. daily Dubbs two-coil selective thermal cracking unit has set a new on-stream record of 178 days.

The previous on-stream record for the Dubbs process was 170 days, reported by Sunray Oil Corp. at its Allen, Okla., plant in April of this year. (The Oil and Gas Journal, page 126, May 6, 1948).

The McMurrey unit went on stream March 26 and was shut down September 20, having experienced no trouble throughout the run. The shut down was a normal routine operation. Temperatures and pressures were the same on the last day as on the first stream day. Average gasoline yield was 51.46 per cent and 4.32 per cent Poly gasoline based on top crude charge.

Refinery Employment Is Up In Delaware River District

A 90 per cent increase in employment in petroleum refining in the Delaware River district, since 1940, makes it the area's fastest growing industry, according to William D. Mason, director of industrial relations, Sun Oil Co. In 1940, the industry employed 10,500 and this year the figure rose to 19,950.

Phenomenal growth of refining along the Delaware makes it second in importance only to the area stretching from Beaumont, Tex., to Houston as a refining center, and about equal to the Los Angeles refining region, Mason said.

He said that the 90 per cent increase in refining employment compares with an increase of 36 per cent for all manufacturing establishments in the district over the same period. In 1941, Mason pointed out, wages paid refinery workers in the area totaled $12,369,000. Last year the figure was $28,277,000, an increase of around 130 per cent.

Refining Sales Show Gain

Net sales of 35 oil refining companies during the second quarter of 1948 totaled $3,602,586,000, a gain of $69,871,000 over the first quarter, according to the Securities and Exchange Commission.

Sour Gas?

To remove heavy sulphur from natural gas, specify Iron Sponge. This concentrated purification material operates efficiently at high pressures, has high capacity and activity. Long periods between foulings, fast come-back after fouling, low initial cost and maintenance—these are the important features that have made Iron Sponge the choice of the gas industry for the past 73 years. Whatever your purification problem—consult Connelly today. We have the experience and facilities to meet your needs and there's no obligation.

CONNELLY, Inc.

3154 S. California Ave., Chicago 8, Ill.
Elizabeth, N. J. Los Angeles, Calif.

INDUSTRIAL
OIL AND GAS
BURNING
EQUIPMENT

AIROIL
NATIONAL
BURNER CO., INC.
1236 E. Sedgley Ave., Philadelphia 34, Pa.

moving?

If you are moving be sure to notify THE OIL AND GAS JOURNAL at least three weeks in advance. When writing, give both old as well as new address. . . . Just clip mailing label from The Journal, indicate new address and mail to

CIRCULATION DEPARTMENT
THE OIL AND GAS JOURNAL
Box 1260 Tulsa 1, Okla.

ONLY ONE

ANTIMONIAL ADMIRALTY HAS STOOD THE TEST OF TIME

CHASE

and only CHASE can make it!

For 13 years Chase Antimonial Admiralty Heat Exchanger Tubes have given great performances in industry. Here's why:

Admiralty with an antimonial content of less than .007% (the minimum set forth in Chase Patent No. 2,061,921) cannot be depended upon to prevent dezincification. Under the entire range of conditions, a minimum of about .015% is essential for reasonably complete protection. The antimonial content of Chase Admiralty is nominally .035% . . . which allows for commercial variation sometimes encountered and thus *assures* you this .015% minimum.

Only Chase can supply you with this patented Antimonial Admiralty because only Chase can make it, and it costs no more than plain Admiralty.

Special stocks of ANTIMONIAL ADMIRALTY Condenser Tubes in Chase Warehouses: BALTIMORE, NEW ORLEANS LOS ANGELES, SAN FRANCISCO *also carried by—* Vinson Supply Co., Tulsa Standard Brass & Mfg. Co., Houston

Chase

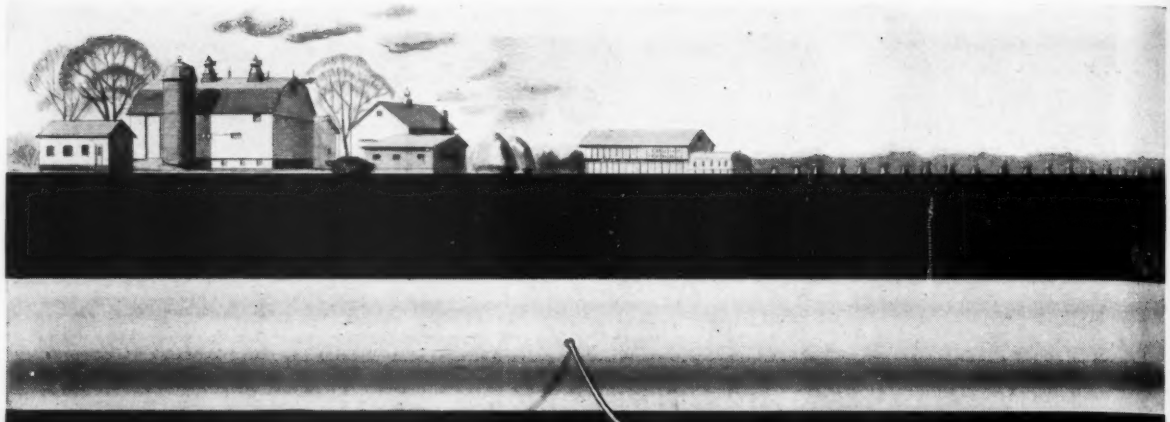
WATERBURY 91, CONNECTICUT

the Nation's Headquarters for BRASS & COPPER

SUBSIDIARY OF KENNECOTT COPPER CORPORATION

THIS IS THE CHASE NETWORK . . . *handiest way to buy brass*

ALBANY† ATLANTA BALTIMORE BOSTON CHICAGO CINCINNATI CLEVELAND DETROIT HOUSTON* INDIANAPOLIS KANSAS CITY, MO.* LOS ANGELES MILWAUKEE MINNEAPOLIS NEWARK NEW ORLEANS NEW YORK PHILADELPHIA PITTSBURGH PROVIDENCE ROCHESTER† SAN FRANCISCO SEATTLE ST. LOUIS WATERBURY (†Indicates Sales Office Only)



LOW DOLLAR

PIPE LINE PROTECTION

Positive corrosion control of your pipe lines can cost as little as a few dollars per mile per year when you install Alcoa Anodes. Compare that to pipe line replacement expense.

These self-powered, buried anode systems for cathodic protection frequently cost less to install and maintain than other protective systems. Alcoa Anodes automatically regulate their current output . . . won't damage pipe line coatings. Install them wherever they're needed along your entire pipe line, for they need no external power source. Thus you have *continuous* protection, unaffected by wind, storm or lightning.

Cast from specially compounded alloys to give maximum protection per pound of metal, Alcoa Anodes are available in sizes to meet your needs, for prompt shipment. ALUMINUM COMPANY OF AMERICA, 625 Gulf Building, Pittsburgh 19, Penna. Sales offices in 55 principal cities.

magnesium

ANODES by ALCOA

ALCOA

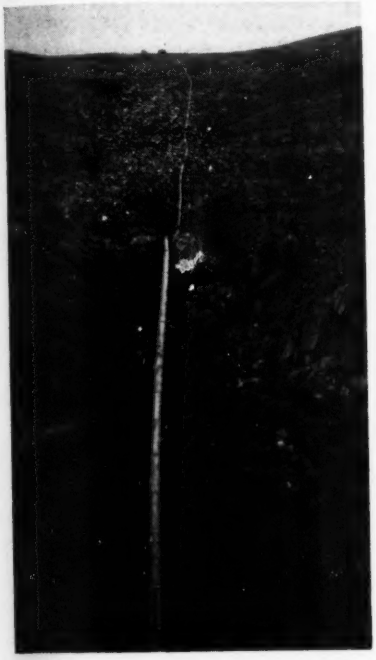
ALUMINUM

PIPE LINES

Argentine Line Is Laid Across Rocky Terrain

Work has recently been completed for laying pipe over one of the principal obstacles in the construction of the Comodoro Rivadavia-Buenos Aires, 1,100-mile, 10-in. natural-gas line being built by Direccion General del Gas del Estado in Argentina. This obstacle was the laying of the line in a 23.7-mile section across hilly and rocky terrain of the Sierra de la Ventana.

By using the route adopted for crossing the Sierra de la Ventana, a saving of 13.7 miles was achieved which resulted in reducing costs by the amount of approximately 1,300,000 Argentine pesos. The original plans had been for a longer route following railroad tracks.



Boom-tractor equipment operating in the Sierra de la Ventana area of Argentina where pipe has been laid on the surface across rocky hills

Atlantic Will Build W. Tex.-Gulf Coast Line

Atlantic Pipe Line Co. is planning to spend $10,000,000 on a new 10-in., 382-mile crude-oil pipe line from the Permian Basin field of West Texas to a point near Refugio, Tex. Construction is scheduled to begin January 1, 1949. Aerial survey for the line has been completed.

The new line will start near Midland at Block 31 pool in Crane County, Texas, and will extend southeasterly to Refugio tank farm, where connections will be made with the company's line from there to Harbor Island marine terminal. With one initial pump station the line will move 20,000 bbl. of oil daily. Elevation drops 3,000 ft. from Midland to Refugio.

Atlantic has an 8-in. line from Block 31 pool to Midland, Tex., where its 10-in. main line extends to Atreco near Beaumont handling 47,500 bbl. per day.

Last year the throughput of Atlantic's Midland-Atreco 10-in. line was

"Everything for the Pipeliner"

PIPE COATING and WRAPPING MACHINES
Stationary and Line Traveling

PIPE CLEANING and PRIMING MACHINES
Stationary and Line Traveling

American Steel Works
HEATING KETTLES

PIPE LINE SUPPLIES AND EQUIPMENT

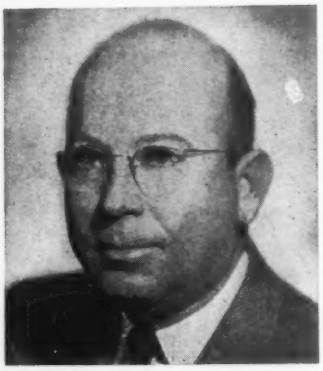
PERRAULT Brothers INC.
1130 NORTH BOSTON
TULSA 6, OKLAHOMA
Phone 5-1104

SIGN OF RELIABILITY

"Esteem cannot be where there is no confidence" is a profound statement spoken by a wise observer. After years of trustworthy service, McVean and Roberts has gained the esteem of the petroleum industry for fast and efficient service. The trademark of McVean and Roberts has come to be a "Sign of Reliability."

McVEAN & ROBERTS
PIPELINE CONSTRUCTION
J. A. McVEAN—MANAGING PARTNER
Box 2607 Odessa, Texas Ph. 3441

THESE ARE THE
Men Behind the Job
who get the Job Done



T. A. Hester believes he has the toughest job in pipelining, that of figuring jobs. Studied law at the University of Arkansas but found pipelining more interesting. Has spent 17 years in pipelining, an experience which includes every phase of the business. It's men like Hester who help make every Oklahoma Contracting job an OK job!

EXPERIENCE
INTEGRITY
EQUIPMENT

The Oldest Pipe Line Contracting Company in the Business... Specializing in Oil, Gas and Gasoline Pipe Lines for Over 30 Years

OKLAHOMA
CONTRACTING CO., Inc.
MERCANTILE BANK BLDG.
DALLAS 1, TEXAS

increased from 40,000 to 47,500 bbl. daily by changing impellers of the electrical-driven centrifugal pumps. In doing this, discharge pressure was raised from 800 to 1,000 psi.

Mich.-Wis. Bond Issue Meets Group Opposition

Opposition to the proposed sale of $66,000,000 in first mortgage bonds by Michigan - Wisconsin Pipe Line Co., Detroit, was recently expressed by various groups in their arguments presented before a Securities and Exchange Commission hearing.

Allied Chemical & Dye Corp., New York, which has approximately $12,000,000 invested in American Light & Traction Co., parent organization of Michigan - Wisconsin, urged that no further financing be attempted before the $6,000,000 preferred stock of the parent company is retired. Otis & Co., banking firm of Cleveland, Ohio, sought competitive bidding to determine purchases of the bonds.

Michigan-Wisconsin has asked SEC to permit negotiated sale of the $66,000,000 in bonds to two life insurance companies. It said the proceeds would finance part of the construction of a 1,500-mile pipe line from the Oklahoma-Texas area to Detroit.

The proposed transaction was claimed by those interests opposing it as (1) contrary to SEC policy; (2) that common stockholders were not informed of the negotiations, and (3) that no further financing should be undertaken by the company until the preferred stock of the parent concern, American Light & Traction Co., Chicago, has been retired.

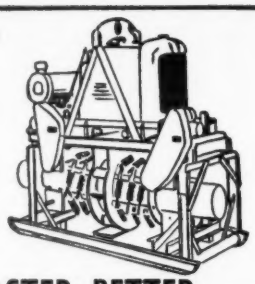
Bridge Construction for 24-In. Crude-Oil Line

The first long suspension bridges ever built for a crude-oil trunk line are now under construction for the Jal-Cushing (Basin) system being constructed under the direction of Texas Pipe Line Co. for four companies including Texas Pipe Line Co., Shell Pipe Line Corp., Empire Pipeline Co., and Sinclair Refining Co.

Bridge construction has been contracted by Austin Bridge Co., Dallas. The bridges consist of one across the Red River, near Wichita Falls, Tex., for which concrete piers are being sunk and another across the South Canadian River of southern Oklahoma to be built with steel piles.

Texas Gas Transmission To Change River Crossings

Texas Gas Transmission Corp. has been authorized by Federal Power Commission to construct and operate two 12¾-in. river crossings across the Mississippi River near Greenville, Miss., and to substitute 11,000 ft. of 26-in. pipe for 9,000 ft. of 18-in. pipe



FASTER, BETTER
PIPE CLEANING...

with Crose pipe cleaning machines. Machines designed for pipe sizes from 2" to 30" diameter. Equipped for stationary or traveling operation. The machines with independent speed control on travel and priming head.

Available in 3 Models:

Model O—2" to 12" Lightweight portable unit for small reconditioning projects.
Model M—2" to 16" pipeline machine.
Model K—16" to 30" pipeline machine.

Available on rental or outright sale basis

M. J. CROSE
MANUFACTURING COMPANY, INC.
2715 Dawson Road Tulsa, Okla.

CORROSION
PREVENTION

• These protective materials for all types of structures, above and below ground, have been proved by years of service to effectively prevent corrosion under most severe conditions. Order them for your next job.

BITUMASTIC

• Hot applied pipe line coating.
• Cold applied coating and paints.

Carey

• Asbestos pipe line felt.

These corrosion prevention products are distributed in Texas and Louisiana by:

James E. MAVOR
514 M & M Building Capitol 2201
Houston 2, Texas

PARKHILL . . . . Pioneer in Pipe Stringing

Since 1920, Parkhill has been the foremost name in the pipe-stringing business. Now back under the ownership of its founder, Roy F. Parkhill, and Gant W. Fowler, Parkhill is better able to service its many old and new customers. Let Parkhill expedite the construction of your next line.

PARKHILL TRUCK COMPANY
(Inc.)

Tulsa, Oklahoma
Box 1856
Tel. 4-6159, 4-6150

El Paso, Texas
Box 94
Tel. 3-4461, 3-4462

RIVER CLAMPS

LLOYD METAL FOUNDRY CO.
Carr and Opelousas Streets
Phone P-5325
HOUSTON, TEXAS

previously authorized as an extension of the approaches to an existing underwater crossing of 14-in. pipe near the same point.

In requesting the authorization the company said that the additional construction would avoid any extended failure of gas supply to its Memphis division customers during the coming winter, in the event the changing course of the Mississippi River should destroy any of its present submarine crossings. The company now has three 10-in. submarine lines and one 14-in. submarine line which broke early in 1948 and is now under repair. Overall cost of the project is estimated at $360,000.

Southern Natural Seeks Additional Facilities

Southern Natural Gas Co. has applied for authorization from the Federal Power Commission to construct and operate in Alabama approximately 8½ miles of 24-in. main-line loops, 9 miles of 12-in. branch-line loop pipe, and three 12-in. lines crossing the Coosa River, for transmission of natural gas.

In its application, Southern Natural said construction of the main line loops would increase capacity of the portion of its pipe-line system between Birmingham, Ala., and Atlanta, Ga. The branch looping line will increase delivery capacity of its Montgomery branch liine by approximately 3,500,000 cu. ft. daily.

The company would like to construct these additional facilities at the same time as the already authorized Pell City loop and Heflin loop because considerable savings can be made by grouping the work. Estimated cost of the project is $865,000.

Interstate Oil Increases Annuitants' Benefits

Interstate Oil Pipe Line Co. will pay cash allowances to annuitants for 1 year to supplement the income they now receive from company benefit plans and social security in order to assist annuitants in meeting higher living costs.

The allowances will be made to annuitants having 15 or more years' service with Interstate or other affiliates of Standard Oil Co. (N.J.) The top limit to which supplemental allowances can raise any annuitant is $3,000 total annual income from company plans plus social security.

The allowance will be paid in four quarterly installments beginning in December.

Standard Oil Co. (N.J.) and participating domestic affiliated companies recently announced that additional annuity payments for service during the years 1936-45 will be made to eligible employes when they become annuitants.

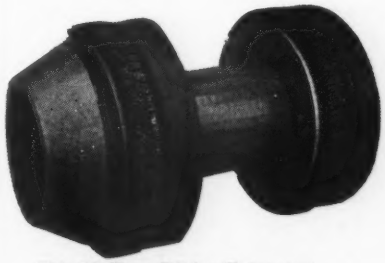
WILLIAMSON PIGS "Tailor Made" for YOUR PIPE LINE

ALL PIGS ARE PROVIDED WITH THE EXCLUSIVE "JET ROTATION" FEATURE*

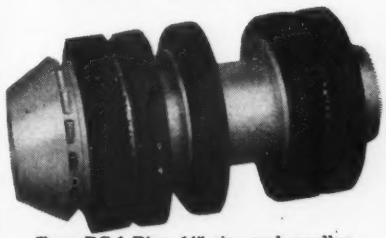
Each Pig Is Designed To Traverse Specified Valves and Fittings — SAFELY

FOR EXAMPLE:

This Type RC-1 Pig, 16" size and larger, is for the usual conditions of:
Conventional gate valves
Full diameter, 90° laterals
Field bends, min. radius 10 ft.

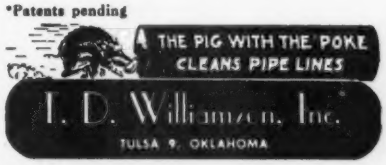


This 22" Type RC-5 will traverse
Through-conduit valves
Full diameter, 90° laterals
Factory ells, 1½ radius, 22½°

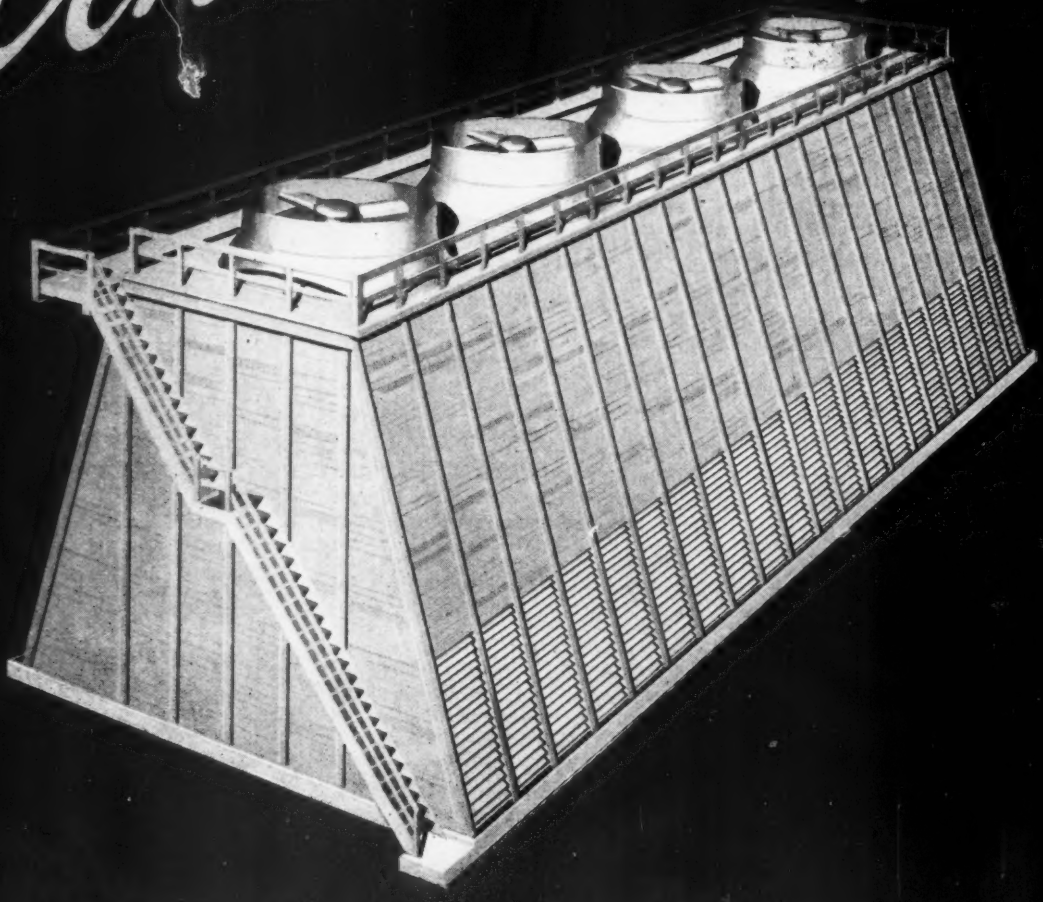


Type RC-1 Pigs, 14" size and smaller, must traverse
Various types of gate valves
Elongated side openings (laterals)
Small-angle sharp bends

*Patents pending



Announcing:



HUDSON

Top Performance

COOLING TOWERS

an outstanding new development in cooling tower engineering!

OFFERS 4 IMPORTANT IMPROVEMENTS

1 IMPROVED AIR FLOW AND AIR-WATER CONTACT

2 ECONOMY IN FABRICATION AND ERECTION

3 LOWER OPERATING COST

4 GREATER STRUCTURAL STRENGTH

ENGINEERS CONSTRUCTORS

HUDSON ENGINEERING CORPORATION

FAIRVIEW STATION HOUSTON, TEXAS

NATURAL GAS

Testimony on Hugoton's Gas Price Is Heard

A HEARING before the Kansas Corporation Commission originally instituted last July by Southwest Kansas Royalty Owners Association, conerning well head gas prices in the Hugoton field resumed in Topeka, Kans., October 18. The commission is still undecided whether it has power to fix prices for natural gas in the Hugoton field and explains that it does not intend to determine the question of jurisdiction.

On October 11 the commission rescinded its denial of Cities Service Gas Co.'s motion to dismiss the royalty owners' application for fixed price and measurement regulations, because a delay in publication of the denial had deprived Cities Service of appeal rights.

Meantime, the commission is hearing evidence on the case. Colin Rae, engineer, Skelly Oil Co., has testified that his company is forced to sell natural gas at the well head for 4 cents per 1,000 cu. ft. because it could not obtain any better offer, while at its Eldorado, Kans., refinery, the company is paying 22 cents per 1,000 cu. ft.

R. A. Ransom, consulting engineer, Washington, D. C., testified that the Hugoton field, if operated under existing conditions, will reach its peak production in 1963 and will show a steady annual decline thereafter. Howard Fleeson, attorney representing the royalty owners, told the commission that the Hugoton gas field is being drained to develop big industrial centers in other states. Over 95 per cent of the Kansas product goes to users in other states, Fleeson said. He further testified that "It won't be necessary to increase prices of gas to domestic consumers in order to provide this basic price at the wells. Earnings of the companies transporting this fuel are already sufficient to permit them to absorb this extra cost."

William Broadhurst, vice president and treasurer, Helmerich & Payne, Inc., and White Eagle Oil Co., which together own and operate 75 gas wells in Kansas, testified that his companies have been required to build lines from 38 of their wells at a cost of $265,500 to connect with facilities of the pipeline companies. He said that "gas producers are forced to accept the price offered by pipe-line companies if they want to market their gas and that they have to market the gas if the want to hold their leases.

John Hanley, production superintendent, Northern Natural Gas Pipeline Co., testified that his company sells gas to distributing companies at cities located in Hugoton gas field area for as much as 18 cents per 1,000 cu. ft. He testified that Northern Natural pays 5 cents per 1,000 cu. ft. for gas that it buys from a well owned by the city of Hugoton and in turn wholesales gas at 18 cents per 1,000 cu. ft. to Peoples Gas Co. for resale to consumers in the city of Hugoton.

A. G. A. Estimates Natural Gas Capital Requirements

Natural-gas companies will have total capital requirements of approximately $2,650,000,000 in the 5-year period 1948-1952, according to estimates of the American Gas Association based on report issued by its committee on economics. The report excludes the needs of liquefied petroleum gas companies.

All gas-utility industry requirements will be about $3,300,000,000. The capital requirements of the natural-gas industry represent about 80 per cent of this figure, manufactured-gas companies accounting for 15 per cent and mixed-gas companies, 5 per cent.

It is estimated that almost one-half of the total gas-utility construction expenditures will be devoted to natural-gas transmission-line facilities alone.

Currently the natural-gas companies, particularly the pipe-line companies, are attracting great interest in financial markets. Companies in this group expect to raise more than 25 per cent of their total requirements from external sources.

United Carbon Buys Imperial's Properties

United Carbon Co., Charleston, W. Va., has purchased all holdings of Imperial Oil & Gas Products Co. and its subsidiary, Hycarbon Gas Corp., Pittsburgh, Pa. The transaction was effective as of October 1.

For the cash consideration of $475,000 and assumption of outstanding obligations of the seller United Carbon Co. becomes owner of five carbon-black manufacturing units; all machinery and equipment; oil and gas leases covering more than 1,200 acres in Ouachita and Union parishes, Louisiana; all patent rights and processes; and all interest of the seller in a suit presently pending in the United States district court for the western district of Louisiana. The suit now pending is Imperial Oil & Gas Products Co. vs. United Gas Pipe Line Co.

The cash consideration was reported divided as $300,000 to Imperial and $175,000 to Hycarbon. The plants of these companies have been in continuous operation for the past 30 years.

West Cement-Medrano Unit Gets Gas Injection Plant

Construction of a pressure-maintainence plant in the West Cement-Medrano sand field of Caddo County, Oklahoma, will start within a month, as a first step toward repressuring the prolific sand zone.

Unitization plans for the field were undertaken in 1946 and in December of that year the plan was presented before the Oklahoma Corporation Commission.

The unit will be operated by Phillips Petroleum Co., who has contracted with Dresser Engineering Co., Tulsa, for plant construction. Dresser has started moving equipment from Anadarko, Okla., to Phillips' Oaks lease in Section 34, 6n-10w, where the plant will be located.

The repressuring plant will have compressor units totaling 1,800 hp. This capacity may be in excess of that needed for the program at present, however plans are under consideration for drilling four additional wells on the south side of the field in order to give more complete development.

A complete account of the unitization and pressure-maintenance plan for the West Cement-Medrano sand field may be found in The Oil and Gas Journal, December 7, 1946, page 80.

FPC Rejects Jurisdiction Over Three Texas Firms

Federal Power Commission has ruled that certain proposed sales of natural gas by Humble Oil & Refining Co., Houston Oil Co. of Texas, and American Republics Corp., all of Houston, Tex., come within the purview of Section 03.79 of its general rules which construes the jurisdictional status of independent producers and gatherers of natural gas.

All three companies own interests in Silsbee field, Texas, and recently entered into contract to sell natural gas individually to Texas Eastern Transmission Corp., stating their application for status determination.

FILTERING CONTACT CLAYS...it's a job that has to be done. There's no avoiding this refining step so why not (1) filter the clays in the continuous way; (2) with practically no effort on labor's part; and (3) with a great reduction in cake oil losses?

In other words, filter contact clays the Oliver Precoat Way!

Plant records show that cake oil content has been reduced from around 50% to 25%. This saving alone makes the investment in the Oliver Precoat Filter well worthwhile. And the fact that operations are continuous and practically automatic, with no maintenance to speak of adds to the usefulness of the Precoat Method of filtering contact clays.

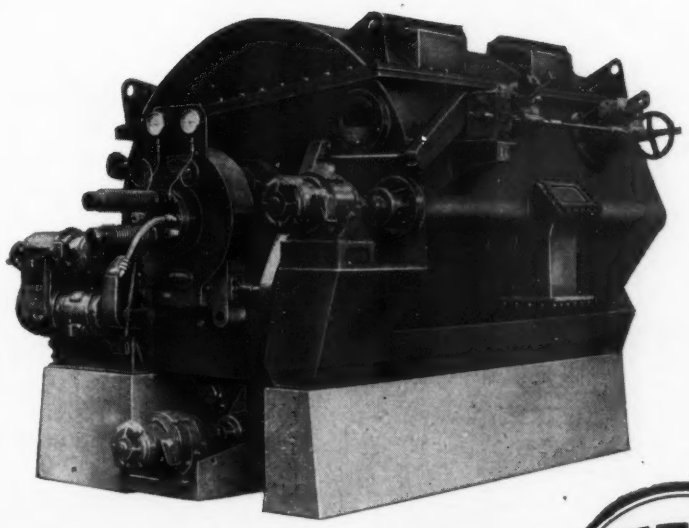
Write for our recommendations for applying Oliver Precoat Filtration for your contact clay removal.

FILTERING

CONTACT CLAYS

- Why Filter in Batches . . .
- Why Continue to Lose More Oil . . .
- Why Continue to Have Higher Maintenance . . .

?!?!



OLIVER UNITED FILTERS INC.

New York 18, N. Y.
33 West 42nd Street

Chicago 1, Ill.
221 N. LaSalle Street

Western Sales Division
Oakland 1, Calif.
2900 Glascock Street

San Francisco 11
California

Factories: Oakland, Calif. • Hazleton, Pa. • Orillia, Canada • Melbourne, Australia

GLOBE ADVANCED ENGINEERING • • • • *Builder of Champions*

the bit that drills FROM TOP TO BOTTOM!

GLOBE 2-CUTTER ROCK BIT

Patent Applied for

Geophysical crews all over the wo are using the Globe 2-Cutter Rock to get the job done. They know fr experience it incorporates—

1. Modern Design:

No other bit of comparable s for example, has such large, p cision ground . . . accurately chined bearings. That's why bit can drill hole after hole–*fr top to bottom*–day after day.

2. High Speed Penetration:

Long, sharp, hard-faced tee tear rapidly through all form tions. They are not balled up sticky digging, nor slowed do when the going gets tough.

3. Top to Bottom Service:

When a crew starts to drill th can expect to go all the way wi the same bit—and party chie know this elimination of chang saves time and money.

Popular sizes now in demand for geophys cal work are 3⅞", 4¼", 4⅝", 4¾", 5⅞ and 6¼". For conventional drilling the are available in all standard sizes up t 12½". Contact your nearest Globe office o representative for further information.

GLOBE OIL TOOLS COMPANY

MAIN OFFICE AND PLANT: LOS NIETOS, CALIFORNIA

Ventura, California Bakersfield, California Santa Maria, California

HAKE TOOL COMPANY. Representative for Southern Texas, Louisiana and Mississippi. Houston, Texas and New Iberia, Louisiana • GLOBE OIL TOOLS (CANADA) COMPANY. Black Diamond, Alberta, Canada • T-P TOOL COMPANY. Cody, Wyoming and Rangely, Colorado • MANUFACTURERS WAREHOUSE COMPANY. 1531 West Main Street, Oklahoma City, Oklahoma • H. D. "SPEC" DONHAM. Box 1904, Odessa, Texas.

Among the

Drilling Contractors

Mud Schools Scheduled For November, December

Dates and locations for three mud schools, a service of the American Association of Oilwell Drilling Contractors in cooperation with the University of Texas, division of extension, have been announced. At Mount Vernon, Ill., sessions will be conducted November 8-19; at Grayville, Ill., November 22-December 3; and at Evansville, Ind., December 6-17.

The course is open to all personnel working in the drilling industry, and consists of standard mud tests; good mud practices in particular areas; use of chemicals, gels and weighting materials in controlling mud quality; and analysis of muds from rigs operating in certain areas. The course, which is a nonprofit education program, is sponsored by the public schools.

A mud school is currently being conducted in Amarillo, Tex., sponsored by the Amarillo Geological Society. Approximately 3,500 field men have earned mud-school certificates since 1946.

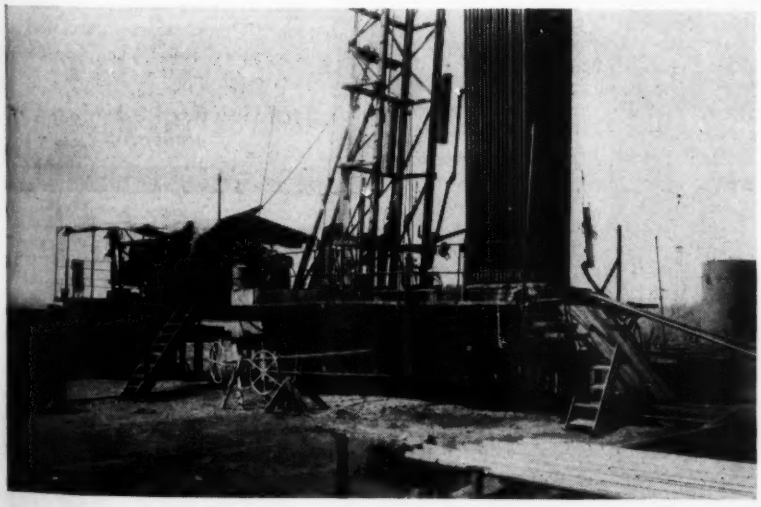
Lankford Drilling Co., Wichita Falls, Tex., has made location for two tests for Commercial Production Co. of Sinton, Tex., both in Kirk field, of Comanche County. The 1-A J. C. Burns is 330 ft. from north and west lines of the C. J. Burns tract in Section 59, Block 2, H&TC Survey. The 2-A J. C. Burns is 330 ft. from north and 990 ft. from west lines of the same tract. Both are contracted to around 3,000 ft. with rotary tools.

Fred Schall, with The Texas Co. at New Orleans, La., for nearly 9 years, has resigned to join Big Chief Drilling Co. with headquarters in Shreveport, La. His area will include Louisiana, Arkansas, and Mississippi.

Pabco Drilling Co. and J. M. Huber Corp. are putting up a new derrick at the 1 Schurr, SE NE SW 21-20-10, in the Raymond pool, Rice County, Kansas, to replace the one previously destroyed by fire.

Zephyr Drilling Co. plans to begin operations soon on the 5,000-ft. wildcat 5 miles southwest of Stillwater, Okla., in Payne County, 1 State Land "A" in SW NE NE of 36-19n-1e. It is 2½ miles north of the Ramsey pool.

Ice Drilling Co., Monahans, Tex., had work under way at Skelly Oil Co. 3 Irene Swan, east offset to production in Eskota field, 8 miles north of Trent, in Fisher County, West Cen-



Briscoe-Clingman Drilling Co., Oklahoma City, recently used this portable Ideco Rambler rig on a well-workover project that called for deepening from 10,475 ft. The rig is equipped with an H-40 Hydrair hoist driven by a 310-hp. G.M. Twin-6 diesel engine. Forty thousand pounds line pull is delivered at the hoist. The entire package including a 96-ft. mast is mounted on a 34-ft. trailer

PENBERTHY

"REFLEX"

WATER GAGE SET

For oil field, locomotive type and marine boilers. Water shows black — steam shows white; the water level is unmistakable. U-Bolt construction is strongest and simplest to service. Glass replaced by simply removing nuts on face of gage . . . unnecessary to work between gage and boiler. Conforms with A.S.M.E., Federal and State requirements when used for pressures specified by their respective codes.

This is one of the complete line of Penberthy gages that meet every liquid level gage requirement.

PENBERTHY INJECTOR CO.

DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

USE 'BESTOLIFE IT'S BETTER

'BESTOLIFE—the Lead Seal Joint Compound used successfully in the Drilling and Refining Industries for years — is immediately available through more than 100 distributors in the U.S.A.

Your nearest supply house field store probably has 'BESTOLIFE in stock for immediate delivery. Use 'BESTOLIFE — it's BETTER!

EXPORT: THE NATIONAL SUPPLY CORP., 30 ROCKEFELLER PLAZA, NEW YORK

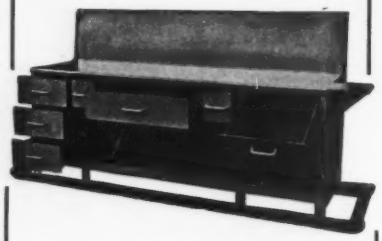
I. H. GRANCELL

801 EAST MACY STREET

LOS ANGELES

OWEN

SAVE YOUR TOOLS— LOWER YOUR COSTS



OWEN TYPE "A" WORK BENCHES protect tools and instruments against loss and damage and save valuable time by keeping the tools most often used within quick, easy reach when needed.

Equip your rigs with these all-steel, all-welded, weather-proof benches and watch your tool loss drop and your crew efficiency increase. Full particulars will be furnished upon request.

SOLD THROUGH ALL SUPPLY STORES

OWEN TOOL COMPANY
4718 West 18th Street V-2-4341
HOUSTON 7, TEXAS

INCREASE PRODUCTION
Clean Out With
MILLER

SAND PUMPS

Pump O. D. sizes are: 2½, 3, 3½, 4¼, 5, 5½ and 7 inches. 20, 25 and 30 ft. length. Strong bail welded to heavy seamless steel tube. Heavy grooved plunger assures liquid seal. Wire line direct connected to plunger for great suction.

MILLER BAILERS

Bailer O. D. sizes are: 3, 3½, 4¼, 5 and 5½ inches. 20, 25 and 30 ft. length.

Miller Sand Pump Co.
General Office Box 4516
1524 SE 29th St.
OKLAHOMA CITY 9, OKLA.

EXPORT OFFICE
30 Rockefeller Plaza
NEW YORK CITY 20, N. Y.
See Composite Catalog Page 2426

tral Texas. The 4,600-ft. rotary operation is in the George M. Robinson Survey 223.

Aylward Drilling Co. and **El Dorado Refining Co.** have started drilling 1 Bemis "B" NW NW NW 16-12-17, 1½ miles south of the nearest production in the Bemis-Shutts field in Ellis County, Kansas.

Maxwell Drilling Co., Coleman, Tex., will drill a 3,300-ft. cable-tool test for Anzac Oil Corp. as an outpost to Bead Mountain field of Coleman County. Location is 3 miles southwest of Valera, Section 27, Block 1, GH&H Survey.

B. F. Gilchrist, Wichita Falls, will drill a Kirk field well, Comanche County, West Central Texas, for **W. B. Johnson Drilling Co.,** Longview. Location has been made for the 2 Cooper Grocery Co. in Section 58, Block 2, H&TC Survey, 3 miles east of Gorman.

George Callihan, Abilene, Tex., has the 4,400-ft. rotary contract for American Republics' 1 D. F. Percifull, north offset test to Bronte (Palo Pinto) field of Coke County, West Texas. Location is in Section 450, Block 1-A, H&TC Survey. American Republics holds a lease on the west half of the section. Road-building was to start this week.

Kingery & Patterson has contract and has begun drilling below surface casing at the South Texas Development Co. 1 Cather in NE NE NW 1-16n-1e in southeastern Logan County, Oklahoma. The location is 3 miles east of the Northwest Iconium pool and 3 miles northeast of the town of Iconium.

Commonwealth Drilling Co., Calgary, has been awarded contract for the Stanolind-Imperial 1 Barrhead wildcat, for a 7,000-ft. Devonian test 70 miles northwest of Leduc. Commonwealth has also been awarded contracts for two Pacific Western Oil Corp. wells, offsetting production in Lloydminster field.

S. B. Roberts, Abilene, Tex., has the contract for Eastland Oil Co. and Carl Echols 1 Ray, a 2,000-ft. cable-tool wildcat 3 miles east of Hamby in Section 64, Block 14, T&P Survey, Callahan County, West Central Texas.

Parker Drilling Co. has contract for Gulf 1 Fred Shrempp, second follow-up of the Pincher Creek discovery in Alberta's south foothills. Parker did the drilling for the discovery and is also drilling Canadian Gulf Oil Co.'s Walter Marr test 7½ miles northwest of the company's first well. Parker is completing rig at Imperial's No. 10 well in Woodbend field, using a rig new to Imperial's extensive drilling operations.

PARMACO
PARKERSBURG MACHINE CO. PARKERSBURG W. VA. U.S.A.
The House of Courteous Service

EXCLUSIVE EXPORT DISTRIBUTOR
PETROLEUM MACHINERY CORP.
30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

PARMACO
EXTENDS GREETINGS TO MEMBERS OF
AMERICAN PETROLEUM INSTITUTE
And You are Invited to Investigate Our Prompt and Friendly Service
YOUR FAVORITE SUPPLY HOUSE WILL FURNISH YOU
QUALITY PRODUCTS
from
PARKERSBURG MACHINE COMPANY
PARKERSBURG, W. VA.

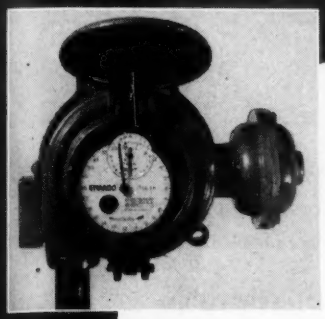
Standco
NO-SMOKE
STANDCO BRAKE LINING
Is the driller's best friend because it makes the easiest brake known and "feeds off evenly while drilling." It never scores brake rims. See pages 3608-3613, Composite Catalog.
Standco Brake Lining Co.
HOUSTON

For QUICK DELIVERY
Gears of all types
- *Quality Controlled*
- *Strength*
- *Quiet Operation*

We make gears of all types from your choice of materials. Large or small orders are given prompt attention.

Frank MATHEY MACHINE WORKS Inc.
Phone 2-9375
114 So. Elgin Tulsa, Okla.

Automatic ENGINE CONTROL



The ENARDO Time-Pressure Switch

A real time-saver in the field!

But not only a time-saver but a big money-saver as well! The ENARDO Time-Pressure switch is a specially fitted clock-type mechanism provided with controls to shut down the engine should the oil pressure drop dangerously low. This feature, alone, may save you many dollars in addition to conserving on operator's expense, return trip mileage and convenience. The Time-Pressure switch, like the Time-Cycle switch, provides for accurate and dependable engine timing on remote pipe line pump units and pumping well engines. Write ENARDO for complete information.

TIME MEANS MONEY TO EVERY MAN ON EVERY JOB

ENARDO Manufacturing Co.
TULSA, OKLA.

Mark Your Choice
OIL AND GAS JOURNAL WALL MAPS!

These authentic wall maps drawn and published especially for readers of The Journal. Accurate and useful. Indicate maps wanted . . . clip this advertisement and mail today!

☐ **1948—CRUDE OIL AND PRODUCTS PIPE LINE WALL CHART**—All crude and products pipe lines in U.S. with owner names. Detailed insets of Houston and Tulsa areas. Locations of major refineries plus listing with capacities. Printed in four attractive colors. Copyright Sept. 1948. Price $2.00 ea.

☐ **NATURAL GAS PIPE LINES OF THE U. S.**—Describes 48 major and 66 smaller gas pipe line systems in U. S. Handsome, four color offset suitable for framing. Size is 36" x 48". Copyright Sept. 1947. **Price $1.50 ea.**

☐ **JOURNAL GUIDE TO WORLD OIL**—Printed four colors, shows principal producing areas, pipe line and tanker routes. World map 36 x 48 in. Copyright Jan. 1947. **Price $1.50 ea.**

☐ **JOURNAL GUIDE TO GULF COAST OIL**—Exact locations Gulf Coast fields, refineries, inland water systems, other facilities. Listings by locations include cycling and natural gasoline plants. Authentic to copyright May 1947. **Each: $1.50.**

☐ **ALL FOUR ABOVE DESCRIBED WALL MAPS $4.00. VALUE $6.50!** You save $2.50 by ordering all of these valuable maps!

SAVE $2.50! BUY ALL FOUR MAPS!

Send selection of offers and check to . . .

THE OIL AND GAS JOURNAL
BOX 1260 **TULSA 1, OKLA.**

LOG WHILE YOU DRILL...
Geolograph logs foot by foot . . . 24-hours a day . . . shows formation changes, drilling depth and down time - - at all times!
Geolograph saves in many ways for both large and small operator! Write for details now!
GEOLOGRAPH
TIME
TIME WILL TELL
THE GEOLOGRAPH CO. INC.
P. O. Box 1291 Oklahoma City 1, Okla.

NOW AMERICAN IRON SPECIA

Straight Grip

TOOL JOINTS FOR DRILL COLLARS

Installed by Hand . . . Removed by Hand at the job site!

Here they are! Replaceable drill collar connections with ALL the advantages of our Straight Grip Tool Joints for drill pipe, PLUS these three additional features:

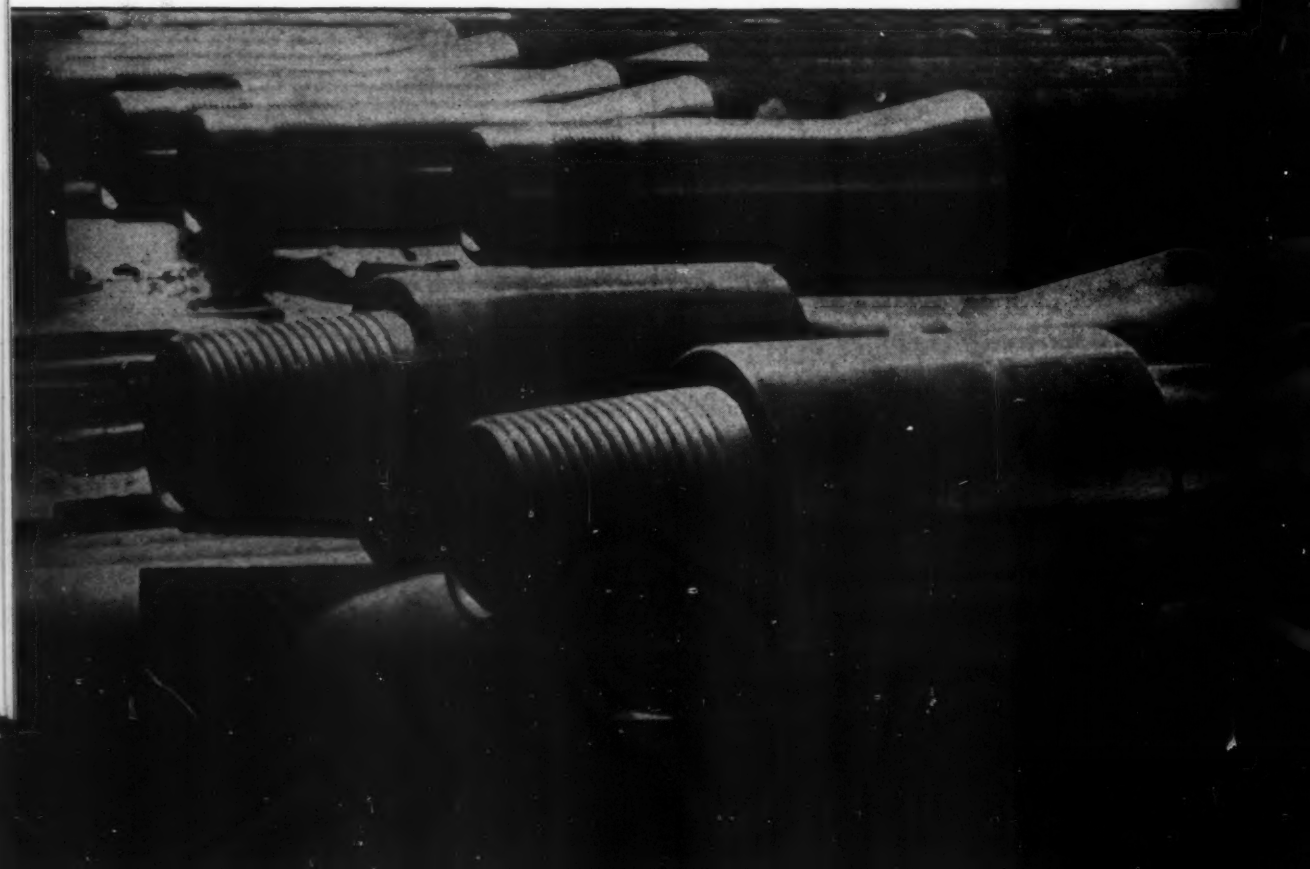
(1) POINT OF FLEXIBILITY . . . American Iron Engineers have so designed this area to attain flexibility which dampens transverse and longitudinal vibrations.

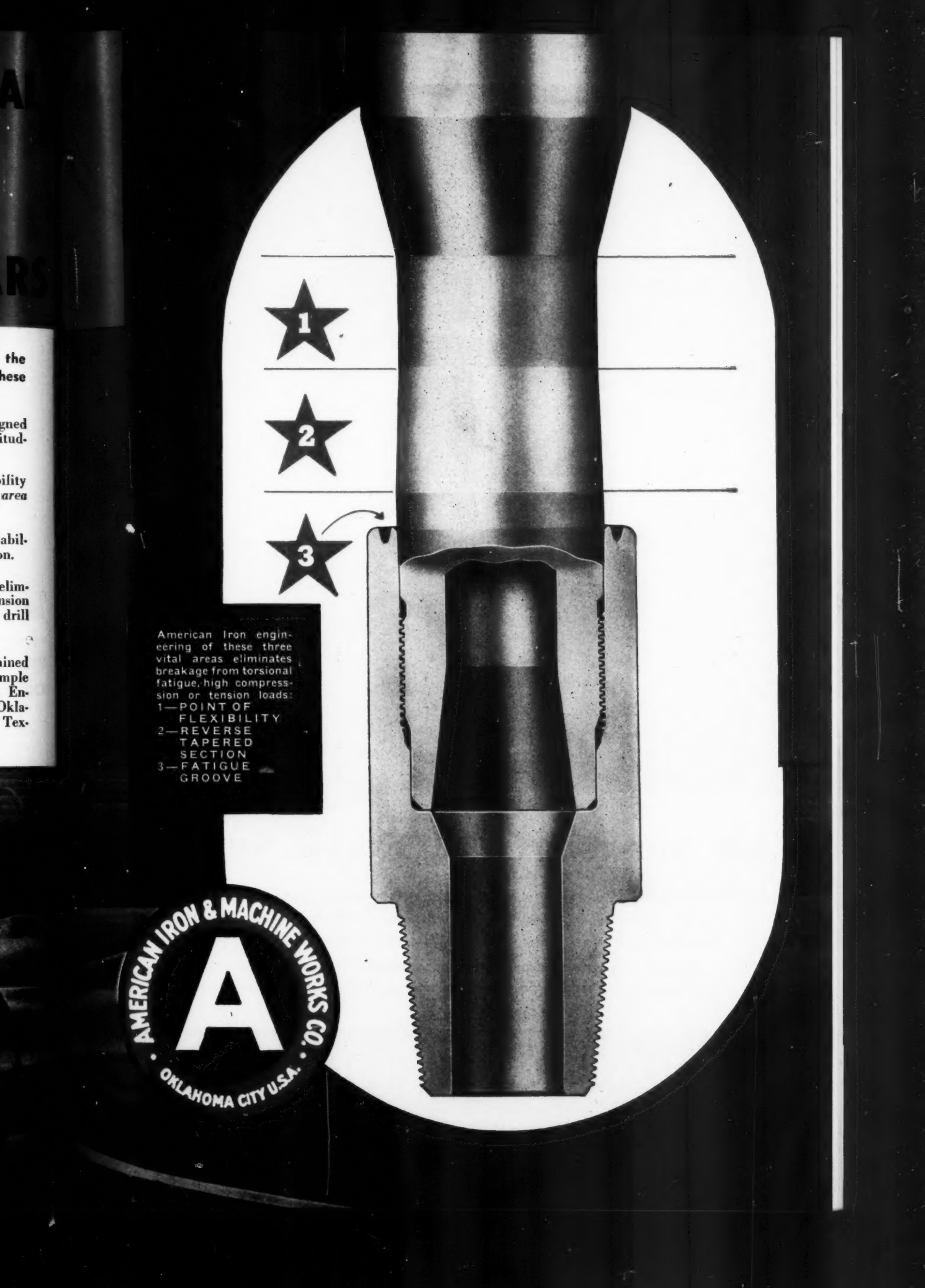
(2) REVERSE TAPERED SECTION . . . This reverse taper produces flexibility to section of drill collar a sufficient distance from *straight grip area* so as to eliminate *fatigue* breaks!

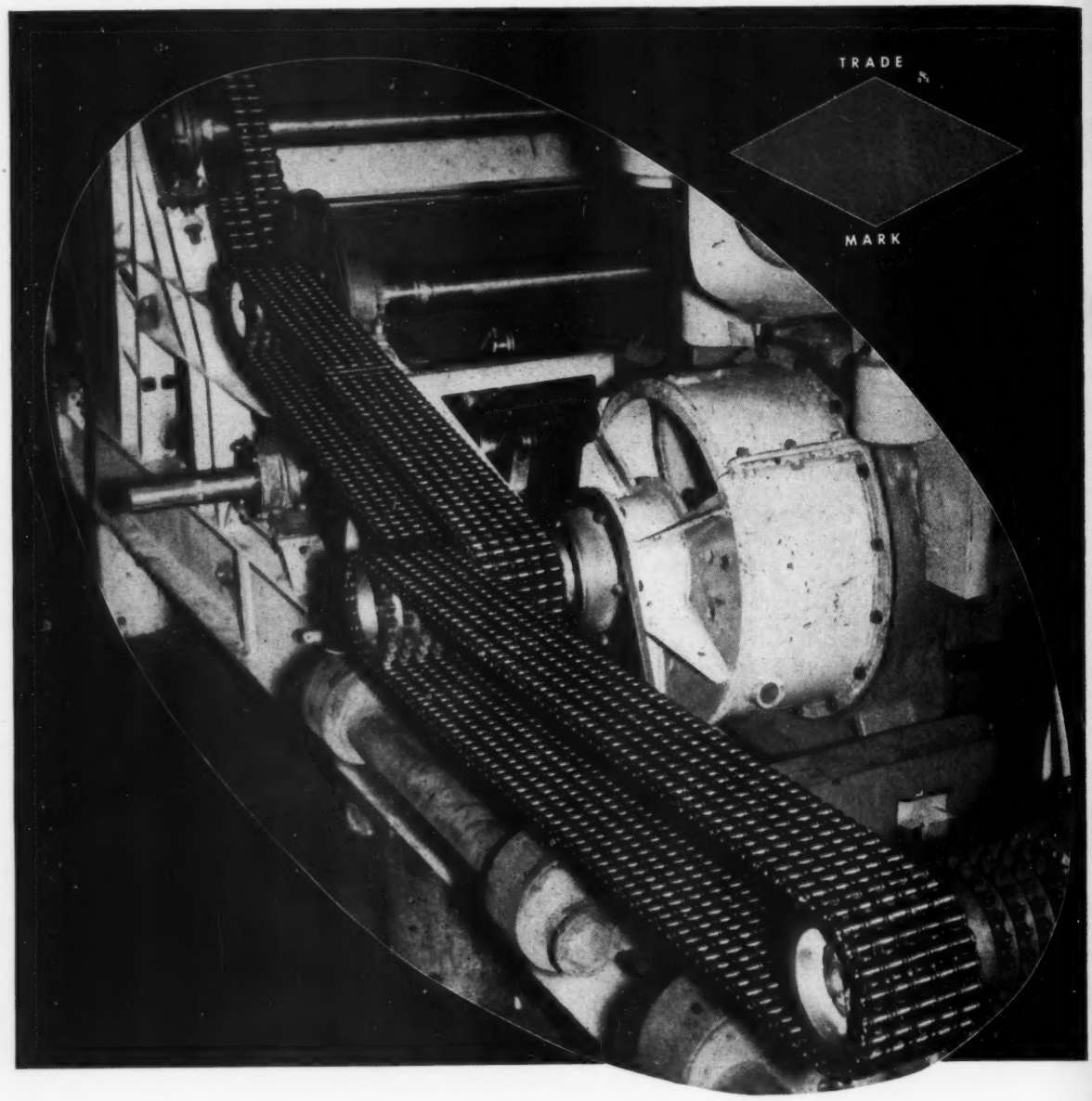
(3) FATIGUE GROOVE . . . This fatigue groove permits the face of stabilizer seal to breathe, thus eliminating pure fatigue at *critical* section.

Remember, American Iron engineering of these *three vital areas* eliminates breakage from torsional fatigue, high compression or tension loads! Also note that the tool joint O.D. is *always* the same as the drill collar!

American Iron *Straight Grip Drill Collar* Connections can be machined in any well equipped oil field machine shop, by following the simple machining and gauging practices established by American Iron Engineers. American Iron & Machine Works Co., Oklahoma City, Oklahoma — Box 1177 — Phone L. D. 518 — District Office, Houston, Texas. Export Office: 420 Lexington Ave., New York City, N. Y.




1
2
3
American Iron engineering of these three vital areas eliminates breakage from torsional fatigue, high compression or tension loads:
1—POINT OF FLEXIBILITY
2—REVERSE TAPERED SECTION
3—FATIGUE GROOVE
AMERICAN IRON & MACHINE WORKS CO.
A
OKLAHOMA CITY U.S.A.



30 Years of Oil Field Service

● During the past 30 years when the greatest development of highly efficient, powerful and compact oil field machinery has taken place . . . Diamond Roller Chain Drives have had ample time to prove their dependable performance.

Leading manufacturers, experienced contractors and oil country operators of drilling, pumping and servicing equipment invariably rate Diamond Drives as first choice.

DIAMOND ROLLER CHAIN DRIVES

Diamond Chain Company, Inc. *Indianapolis 7, Indiana*

Exploration and Drilling

How Will End of Oil Shortage Affect Exploration?

THERE is a certain amount of speculation among exploration men about the future. The general recognition that the oil shortage is over is responsible for the speculation. As of this time, no definite trends in thinking can be said to have crystallized.

But several ideas are expressed repeatedly. The main one is that we still have the problem of replacing at least 2 billion barrels of oil each year that will be consumed. By any prewar standards, that is a good-sized job. Another one is pointed out mostly by people familiar with large-company operations. It runs something like this.

It is not enough to have reserves built up to the point where you can just barely meet the demand each year. In order to have room "to turn in," the industry as a whole, and particularly the larger companies as individual units, need a reasonable surplus of reserves. For a large company, the whole investment in pipe lines, tankers, barges, refineries, tank cars, terminals, and service stations rests on a foundation of crude-oil reserves.

From a money angle, all these other investments exist to turn crude oil into cash from the ultimate consumer. If the oil shortage is over, then competition will be keener than ever. For one thing, the volume of business is bigger, and therefore the stakes are larger. When you have keen competition, you have to have flexibility in your own operations.

If you have pipe lines, and there is competition, you want to have a substantial backlog of crude production of your own in areas where you can feed your own pipe line. When crude is plentiful, it isn't as easy to work out crude-oil trades. You want, if possible, to feed your own crude production into your own pipe lines at one end, and take it out at your own refinery at the other end. The margin of profit in times of surplus production, may be higher in transportation, or perhaps in refining, or marketing, than it is in production, even for the most efficient producers.

When profit margins shift around, the operator who can come nearest to handling his own crude all the way to the ultimate consumer doesn't have as many worries. What he loses on a thin margin in one operation, he may make up for with a fat margin in another operation.

Other exploration men talk about improved quality of exploration work. A common expression is that "if the pressure for quantity exploration eases off, we'll get a chance to do some thinking around here that we don't have time for now."

Most exploration people sum things up as a "wait a while and see" conclusion. The 1948 program is pretty well along, and commitments have already been made. Undoubtedly there will be a lot of mulling over things during the next few months as the 1949 exploration budget estimates are being worked up. By the time these budgets are submitted to the various executive committees for action, the situation will have clarified itself at least a little.

As one executive said—"Prices are high, but so are costs. Take some of the pressure off of my men, and give us a chance to get materials and work done at reasonable prices, and we may surprise you with our profit showing. As long as we can see good profits in exploration, we aren't going to slow down much—if any."

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

ROCKY MOUNTAIN.—Western Natural Gas Co. et al 2 English, discovery of oil in the Coconino at Boundary Butte, San Juan County, Utah, is the third discovery in the state in the past month. General Petroleum's Freedon Dome wildcat, Garfield County, is below 6,000 ft. in the Charles, and Phillips Petroleum Co.'s Alice Dome test passed 5,000 ft. through the Kibbey. Activities have increased on the east side of the Powder River Basin of Wyoming following the recent discovery of oil at Clark Drilling Co.'s Fiddler Creek venture.

TEXAS GULF COAST.—Stanolind Oil & Gas Co. 2 State, Lease 31,602, offshore operation in Tract 144 approximately 13 miles east of Galveston, reported oil saturation on electric log and on sidewall cores at a depth of 1,632 ft. L. H. Smith Exploration Co. reported sands in excess of 100 ft. in the 1 Pattillo-Marshall et al, Unit 1, northwest extension test at North Port Neches field, Orange County. Top of sand was cored at 8,560 ft., and cores taken at 8,774 ft. showed that the operators were still in the pay. Total depth is 8,825 ft.

PERMIAN BASIN.—Pennsylvanian production in the Jameson field, Coke County, was extended 1 mile to the southeast by Al G. Hill's 2 Harris Estate which made a natural flowing potential of 358 bbl. of 48.4°-gravity oil per day from the Strawn sand at 5,808-48 ft.

CANADA.—Socony-Vacuum Exploration will drill its first venture on the Alberta Plains 90 miles northeast of Calgary and 8½ miles northwest of Hanna Petroleums Co.'s recent wet gas discovery in the Sunburst sand.

OKLAHOMA.—Gulf Oil Corp. has the deepest current oil producer of the Mid-Continent area at 1 Mainka, NW NW NE 12-5n-5w, Grady County. The well made 643 bbl. of oil in 6 hours through ¾-in. choke from a lower bromide sand between bottom of casing set at 13,137 ft. and total depth of 13,250 ft. The well is drilled on a unit of four sections with the following companies sharing in the unit: Carter Oil Co., Sinclair Prairie Oil Co., Magnolia Petroleum Co., British-American Oil Producing Co., Skelly Oil Co. and Phillips Petroleum Co. The well is just inside Grady County and on the northwest trend from pools in Garvin and McClain counties that make up the Golden Trend.

Are your slush pumps "EATING UP" your profits?

Do jammed valves, leaky pistons, and scored piston rods "eat up" your profits by reducing slush pump efficiency and increasing shut-down time?

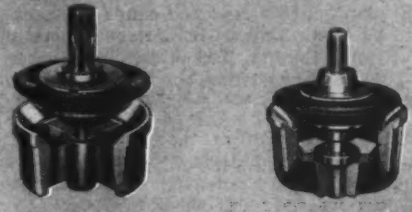
If they do, here's a suggestion: Install Mission Valves, Pistons, Rods, and Gland Packings in ***all*** your pumps.

Then follow the suggestions of your Mission Field Service Man as to replacement practices and schedule. Here's what you'll find:

FIRST, your pumps stay on the job better! Shut-down time will be reduced and you will be able to depend on your pumps when the going is tough.

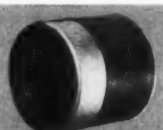
SECOND, you will realize important savings in costs! Replaceable piston rubbers, replaceable valve inserts and the long life inherent in Mission Products, contribute to low replacement costs.

Once you have tried them, it will be easy to see why more Mission Pump Parts are sold throughout the world than any other make.



MISSION
"Super-Service"
SLUSH PUMP VALVE
Champion for *extremely* severe service. Proved sturdier and longer-lived through four years of field testing.

MISSION
"Silver Top"
SLUSH PUMP VALVE
The most economical valve for *general* service. Replaceable wear taking bushing means longer valve seat life.



MISSION GLAND PACKING
Pressure seal regulates packing tightness for longer packing and rod life.

MISSION PISTON ROD
"Super-Surfaced"* or "File Hard" types for lowest rod costs under any conditions.

MISSION
SLUSH PUMP PISTON
Easily replaceable rubbers permit saving the piston body and the extra long rubber life reduces replacement costs.

MISSION MANUFACTURING COMPANY
P. O. BOX 4209 HOUSTON 14, TEXAS
EXPORT OFFICE: 30 Rockefeller Plaza, New York 20, N. Y.
EUROPEAN ADDRESS: London, England.

*Trade Mark Registered U. S. Patent Office

Mission
slush pump parts

TEXAS GULF COAST

Stanolind Claims First Texas Offshore Producer

HOUSTON.—The first oil discovery in the Gulf of Mexico off the Texas coast is indicated at Stanolind Oil & Gas Co. 2 State, Lease 31,602, located approximately 13 miles offshore from Galveston in Tract 144. At total depth of 1,663 ft., electric log was run which revealed oil saturation around 1,632 ft. Operators may drill ahead to the salt. Projected depth is 5,200 ft.

A large section of sand showing gas, distillate, and oil is reported to have been found approximately 3,000 ft. off northwest flank of North Port Neches field, Orange County. Lloyd Smith Exploration Co. 1 Pattillo-Marshall et al Unit, in John Stephenson Heirs Survey, topped the gas and distillate section at 8,560 ft. and cored this to 8,774 ft. Oil sand was reported from 8,774-8,806 ft. The 5½-in. casing was set at 8,823 ft. Total depth is 8,825 ft.

Sun Oil Co. 1 Broussard Trust at Hillebrandt Bayou in John McNabb Survey, Jefferson County, opened a new pay for the field. Drilled to total depth of 8,265 ft., with production casing cemented on bottom, perforations were made from 8,092-8,110 ft. Through ⅛-in. choke, well flowed at rate of 1,000,000 cu. ft. gas per day, flowing pressure 2,525 psi. The discovery well, James F. Morse & Co. 1 Wallace Talbot, was completed through perforations at 7,759-7,761 ft., flowing 166 bbl. of 39.4°-gravity oil per day through ⅛-in. choke.

Rudco Oil & Gas Co. 2 Sparkman, wildcat test in northwestern Bee County, on a 30-minute drill-stem test, recovered 1,800 ft. oil, 60 ft. mud, and 30 ft. salt water through ¼-in. chokes from 7,153-58 ft. in upper Wilcox zone. Operators will continue to test. This test is in Asa Walker Survey, east of Mineral townsite.

Chocolate Bayou production, Brazoria County, has been extended 1 mile south by Phillips Petroleum Co. H-1 Houston, in E. Andrews Survey, Abstract 5. Total depth is 11,706 ft., with 5½-in. casing cemented at 11,702 ft. Well flowed 4,596,000 cu. ft. gas and 292.74 bbl. 46.1°-gravity condensate per day through perforations at 11,024-54 ft. Open flow calculation is 70,000,000 cu. ft. gas daily.

TEXAS GULF COAST (DISTRICTS 2 & 3) SUCCESSFUL WILDCATS

Jackson County: New oil pay, Francitas field—McKay Donkin & Lloyd H. Smith 1 Lovett Est., Patrick Green Sur., 4,000 ft. NE of old production at Francitas field, top pay 7,933 ft. Upper Kopnicky sand, TD 7,953 ft., open hole 7,947-53 ft., IP: 120 bbl. oil per day through ⅛-in. choke, GOR 600, TP 875 psi., CP 1,425 psi., gravity 41.4°.

Refugio County: New gas-condensate pool, "Blanco Creek"—Southern Minerals Corp. 1 W. S. Perryman, in J. de la Garza Trudo Sur. A-287, 5½ mi. N of Refugio, dual completion: top pay 6,630 ft., TD 7,175 ft., perf. 6,630-35 ft., IP: 27,000,000 cu. ft. gas per day on open flow, plus condensate, shut-in pressure 2,393 psi., no water. Lower pay 7,114 ft., perf. 7,114-17 ft., IP: 9,250,000 cu. ft. gas per day open flow, plus condensate, shut-in pressure 3,023 psi., no water.

Victoria County: New gas discovery—Jergins Oil Co. 1 J. H. Fleming, in F. G. Hidalgo Grant, 7 mi. S of Victoria and 1 mi. S of Coletto Creek field, 3½ mi. SE of Raisin, top pay 3,264 ft., TD 5,036 ft., perf. 3,264-65 ft., IP: 423,000,000 cu. ft. gas per day through ⅛-in. choke, TP 1,200 psi., shut-in pressure 1,215 psi., no water.

TEXAS GULF COAST (DISTRICTS 2 & 3) WILDCAT FAILURES

Goliad County: Woods Drilling Co. 1 V. C. Preiss, H. M. C. Hall Sur., A-167, 12 mi. NE of Goliad, dry, TD 10,287 ft.

Harris County: J. K. Dorrance 1 J. M. Baumert, J. Duckworth Sur., A-276, approx. 2½ mi. N of Cypress Twst., dry, TD 7,102 ft.

Walker County: Placid Oil Co. 1 John T. Smither et al, B. F. Dyer Sur., A-162, 11 mi. NW of Hunsville, dry, TD 3,643 ft.

Wharton County: G. R. Gentry et al 1 Sitta, S. F. Austin League, A-2, 4 mi. E of Boling townsite, dry, TD 652 ft.

Grubb & Hawkins 1 F. H. Raaz, in E. C. Ogden Sur. 35, 3½ mi. S of El Campo, dry, TD 6,505 ft.

Lloyd H. Smith & McKay Donkin 1 F. T. & L. F. Schumaker, ETRR Sur., 7 mi. S of Pierce townsite, dry, TD 7,311 ft.

Wilson County: W. R. Quin et al 1 A. C. Oefinger, in Jose de la Garza Sur., 3,250 ft. SE of Bexar-Wilson county line, dry, TD 3,047 ft.

MISSISSIPPI

Two Producers Completed In La Grange Field

JACKSON.—Oil sand was cored from 6,378-92 ft., at Fred Hodge & C. H. Wansley 1 Ogden, 42-6n-2w, in the South La Grange area, Adams County. Operators are preparing to run casing. Total depth is 6,450 ft.

H. L. Hunt 1 W. L. Graves, 29-6n-2e, in Franklin County, 7 miles west of Meadville and 2 miles south of U. S. Highway 84, is reported to be drilling below 10,880 ft. in Lower Cretaceous, and that approximately 10 ft. of sand with good gas condensate show was encountered in the upper part of the Lower Tuscaloosa section.

Two oil producers were completed in La Grange field of Adams County. Magnolia Petroleum Co. 3 Stanton, 84-7n-2w, pumped 70 bbl. on final test through perforations at 6,168-70 ft. Total depth is 6,228 ft. Sohio-Roeser & Pendleton B-2 E. M. Baker, 34-6n-2w, was drilled to total depth of 6,256 ft., and pumped 174 bbl. on completion through perforations at 6,210-16 ft.

Humble Oil & Refining Co. 1 Geo. F. & James W. Hart, Inc., 22-1n-14e, in Sandy Hook field, Marion County, flowed 1,072,000 cu. ft. gas plus 15 bbl. condensate per day through perforations at 9,014-20 ft.; gravity 53°.

MISSISSIPPI WILDCAT FAILURES

Franklin County: Honolulu Oil Corp. 1 Alice Shell, SE NE 26-5n-2e, dry, TD 11,210 ft. Top Tuscaloosa 10,198 ft., Marine Tuscaloosa 10,550 ft., Lower Tuscaloosa 10,876 ft., L. Cret. 11,126 ft.

George County: Ohio Oil Co. 1 Dantzler Lumber Co., 20-3s-8w, dry, TD 5,933 ft., Top Wilcox 2,940 ft., Midway 4,883 ft., chalk 5,593 ft.

Harrison County: Hassie Hunt Trust 1 Southern Minerals Corp. et al, NE SW 17-5s-13w, dry, TD 9,010 ft. Top Wilcox 3,512 ft., chalk 6,350 ft., Base Austin 7,116 ft., Eutaw 7,412 ft., Tuscaloosa 7,596 ft., Massive 8,688 ft.

Sharkey County: M. T. Halbouty et al 1 School Board, 16-11n-7w, dry, TD 3,520 ft. Top Wilcox 1,626 ft., Midway 2,855 ft., Gas Rock 3,328 ft., Travis Peak 3,355 ft.

Wayne County: Southeastern Drilling Co. 1 U.S.D.A., NE NE 20-7n-9w, dry, TD 7,875 ft. Top Tuscaloosa 6,597 ft., Marine Tuscaloosa 7,357 ft., Lower Tuscaloosa 7,540 ft., Massive 7,674 ft., Lower Cretaceous 7,817 ft.

ALABAMA WILDCAT FAILURE

Escambia County: Hunt Oil Co. 8 T. R. Miller Mill Co., Center NE NE 5-3n-12e, dry, TD 6,018 ft. Ran electric log to total depth.

N. CENTRAL TEXAS

Fourth Pay Zone Is in Prospect for Chico Field

WICHITA FALLS.—A fourth, and deeper pay zone in the Bend conglomerate was reported in prospect for Chico field of Wise County. Kingwood Oil Co. 1 Roberts, C. W. Engery Survey, ran a 2½-hour drill-stem test from 5,791-5,835 ft., showing gas at the surface in 5 minutes and recovering 100 ft. of 44.5°-gravity oil, plus 530 ft. of oil and gas-cut mud. After the test it drilled ahead below 5,850 ft.

Kingwood's 1 Curtner, northwest outpost to the field, was preparing to test after perforating casing from 5,814-20 ft. On the southeast flank of the western producing area, Cities Service Oil Co. 1-B Berry swabbed fluid with no shows of oil or gas after acidizing perforations from 5,744-70 ft.

Continental Oil Co. will accelerate the search for oil in Wise County, as the result of its reputed leasing of some 40,000 acres in the east and central part of the county. Main portion of the block was said to center 10 miles northeast of Decatur and extending south to Boyd. Drilling plans have not been formulated, pending detailed seismic work.

In Montague County, Continental Oil Co. 1 Susette Myers, 4 miles southeast of Montague, drilled conglomerate from 6,468-77 ft., then drill-stem tested from 6,470-77 ft. Gas came to the top in 2 minutes, and flowing oil in 7½ minutes. Recovery in the pipe was 930 ft. of clean oil, with no water. Bottom-hole pressure registered 2,855 psi. in 10 minutes. It was drilled to 6,490 ft., and a 21-minute test made from 6,481 ft. to total depth. Gas surfaced in 3 minutes, and the recovery was 840 ft. of clean oil, plus 30 ft. of oil-cut mud. A third test was being prepared from 6,528-35 ft.

Montague County gained a new 6,000-ft. wildcat at Tex Harvey Oil Co. 1 Caps, located 721 ft. from north and 467 ft. from west lines of Block 81, J. H. Belcher Survey, and 2 miles south of the Belcherville townsite. Location is northeast of recently discovered conglomerate production.

In Young County, Cities Service Oil Co. 1 M. K. Graham was dry in the Marble Falls at 4,291 ft., then plugged back to complete in the Caddo at 3,703-15 ft. After acid treatment, it tested 151 bbl. of oil in 5 hours through 14/64-in. choke, and was shut in for official test. Total depth was 4,315 ft.

In Trockmorton County, M. A. Grisham 1 Morrison, 3 miles north of the center of the south county line, completed for 55.5 bbl. of 40°-gravity oil a day through ¼-in. choke from Strawn sand at 3,919-27 ft. Southwest of the discovery, Grisham 1 Halbert ran a 1-hour drill-stem test from 3,916-24 ft., recovering 30 ft. of clean oil and 220 ft. of heavily oil-cut mud.

NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) SUCCESSFUL WILDCATS

Archer County: Fain & McGaha 1 W. L. King, Wm. Henry Sur., 2 mi. E Archer City, pumped 80 bbl. 41°-gravity oil a day, plus 50 bbl. water, sand 3,752-80 ft.

Cooke County: Harvey Drilling Co. 1 E. R. Haynes, Henry Baker Sur., 3 mi. NE Woodbine, pumped 42 bbl. 27°-gravity oil a day, perforations 4,282-93 ft., TD 4,815 ft.

Comanche County: H. B. Owenby Drilling Co. 1 W. F. Flatt, Sec. 39, Blk. 2, H&TC Sur., 5 mi. NW DeLeon, flowed 41 bbl. 38°-gravity oil a day, ½-in. choke, perforations in lime 2,787-2,818 ft., TD 2,890 ft., casing pressure 100 psi.

Wise County: Dwight M. Ross 1 G. J. Ellis, Jesse Couch Sur., 2½ mi. E Bridgeport, flowed 5 bbl. 40°-gravity oil a day, 8/64-in. choke, nitro shot 3,999-4,025 ft., and 3,976-99 ft., TD 4,048 ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) WILDCAT FAILURES

Archer County: Akin & Dimock 1 J. F. O'Donohoe, ATNCL Sur., 6½ mi. SE Mankins, dry, TD 5,447 ft.

Brown County: G. W. McClung and W. H. Greene 1 C. W. Ford, HT&B Sur., 3½ mi. NE Bangs, dry, TD 1,506 ft., Caddo 1,435 ft.

Callahan County: French Robertson 1 H. E. Jones, BBB&CRR Sur., 5 mi. SW Clyde, dry, TD 1,850 ft. in shale.

Coleman County: J. E. Alexander 1 Frank Bryan, Mateo Del Foro Sur. 260, 3 mi. SW Rockwood, dry, TD 1,938 ft., Ellenburger 1,930 ft., had small amount of oil when bailing.

Eastland County: J. R. Hunter 1 T. J. Choat, Sec. 66, Blk. 1, Theresa Tyler Sur., 4 mi. NE Gorman, dry, TD 2,900 ft., Marble Falls 2,795 ft., swabbed 5 bbl. oil a day.

Jones County: Sohio Petroleum Co. 1 H. C. Rogers, Sec. 5, Blk. 4, H&TC Sur., 2 mi. S Stamford, dry, TD 3,950 ft., Gunsight 2,350 ft., Palo Pinto 3,621 ft.

Montague County: M. W. Blair 1 Ray Wines, Blk. 94, Kaufman CSL Sur., 10 mi. NE Nocona, dry, TD 3,312 ft.

Continental Oil Co. 1 W. W. Parr, T. G. Timmons Sur., 1½ mi. E Ringgold, dry, TD 6,051 ft., Ellenburger 5,944 ft., elev. 889 ft.

Tex Harvey Oil Co. 1 J. B. Ritchie, Sec. 66, J. H. Belcher Subd., 2 mi. S Belcherville, dry, TD 1,912 ft.

Throckmorton County: Grisham Hunter Corp. 4 R. W. Kelly "A," Sec. 30, Comanche Indian Res. Sur., 9 mi. SW Throckmorton, dry, TD 5,015 ft., Mississippi 4,544 ft., Ellenburger 4,889 ft.

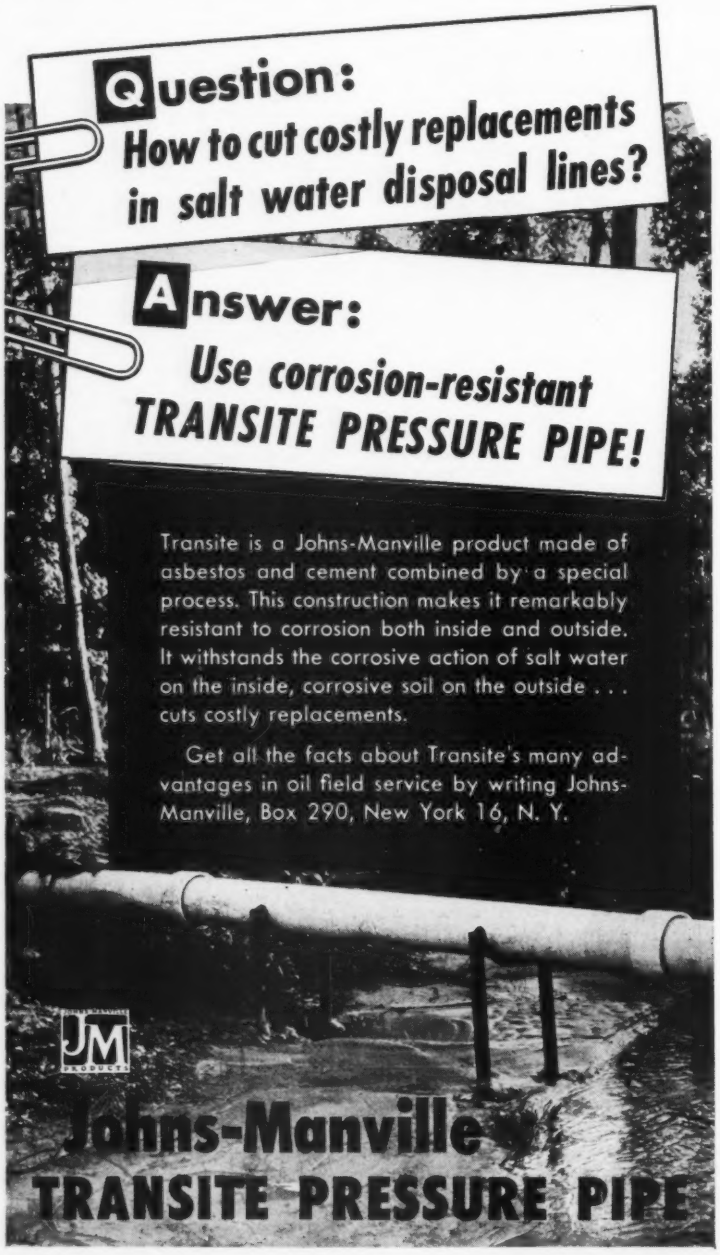
Russell Maguire et al 2 A. C. Caswy, TE&L Sur., 21½ mi. NE Jean, dry, TD 4,404 ft.

H. B. Mummert, Jr., 1 A. H. Taylor, Sec. 1,625, TE&L Sur., 7 mi. S Throckmorton, dry, TD 910 ft.

Wichita County: Akin & Dimock 1 W. E. Marshall, Sec. 3, SFIW Sur., 6½ mi. W Iowa Park, dry, TD 3,123 ft.

Wise County: Big Bear Oil Co. 1 J. T. Hunt, N. Mackey Sur., 6 mi. NW Chico, dry, TD 5,935 ft., conglomerate 5,379 ft.

W. J. & John J. Moran 1 T. L. Vroft, J. Ritchie Sur., 8 mi. NW Chico, dry, TD 6,012 ft., Caddo 5,586 ft., conglomerate 5,745 ft.


Question:
How to cut costly replacements in salt water disposal lines?
Answer:
Use corrosion-resistant TRANSITE PRESSURE PIPE!
Transite is a Johns-Manville product made of asbestos and cement combined by a special process. This construction makes it remarkably resistant to corrosion both inside and outside. It withstands the corrosive action of salt water on the inside, corrosive soil on the outside . . . cuts costly replacements.
Get all the facts about Transite's many advantages in oil field service by writing Johns-Manville, Box 290, New York 16, N. Y.
JM
Johns-Manville
TRANSITE PRESSURE PIPE

SOUTHWEST TEXAS

Atlantic Opens New Pool Near Eagle Hill Field

CORPUS CHRISTI.—A new gas-condensate pool has been opened in Duval County by Atlantic Refining Co. 1 Hagist Ranch, Inc., in BS&F Survey 267, 10 miles northeast of Freer and 1¼ miles northeast of Eagle Hill field. On potential test it flowed 2,550,000 cu. ft. of gas and 59 bbl. of condensate per day through a ¼-in. choke, tubing pressure 1,850 psi. Gravity 56.7°. Total depth is 10,081 ft., and production is at 7,044-7,208 ft.

Henderson Coquat & Algord Co. 2 H. A. Dillon, new pool discovery in Dimmit County, on potential gage pumped 20 bbl. oil per day through open hole at 4,890-4,932 ft. Total depth is 5,210 ft., top of pay 4,900 ft. in Navarro sand. Well is located in GWT&P Survey 41, 4 miles southwest of Catarina.

Baldride & King, Inc., 1 Dario Guerra, wildcat test in GCSF Sur. 877, 7 miles southwest of La Reforma townsite and southeast of Sun field, Starr County, is cutting out drill pipe below 3,500 ft.

Tide Water Associated Oil Co. et al 2 Guaranty Title & Trust Co., second producer in discovery pay at West Corpus field, Nueces County, gaged 20 bbl. of 47°-gravity condensate and 407,000 cu. ft. of gas per day; working pressure 725 psi.; gas-condensate ratio 20,350. Total depth 11,350 ft., with perforations at 11,145-70 ft. Well is in Tract 5, J. C. Russell farm tracts subdivision, Enrique Villareal Grant.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) SUCCESSFUL WILDCATS

Dimmit County: New oil discovery, Catarina, Henderson Coquat & Algord Co. 2 H. A. Dillon, in Lot 2, Block 111, Taft Catarina Farms Subd. "C," in GWT&P Sur. 41, A-110, 4 mi. SW of Catarina, top pay 4,900 ft. (Navarro sand), TD 5,210 ft., plugged back total depth 4,932 ft., open hole 4,890-4,932 ft., IP: 20 bbl. oil per day on pump, gravity 42°, 4 bbl. per day of water.

Duval County: New gas-condensate discovery—Atlantic Refg. Co. 1 Hagist Ranch, Inc., BS&F Sur. 267, 10 mi. NE of Freer and 1¼ mi. NE of Eagle Hill field, top pay 7,044 ft., TD 10,081 ft., perf. 7,044-70 ft., 7,094-7,102 ft., 7,120-32 ft., 7,189-7,208 ft., IP: 2,550,000 cu. ft. gas per day and 59 bbl. per day condensate through ¼-in. choke, TP 1,850 psi., casing sealed, gravity 56.7°, no water.

Starr County: New oil discovery: Sunray Oil Corp. 1 Davenport-State, El Panal area, in CCSD&RGNG Sur. 280, 19 mi. N of Sullivan City, 1¾ mi. E of Rincon field and 1½ mi. SW of Sunray 1 Slick gas discovery well, at El Panal field, top pay 4,273 ft., TD 6,002 ft., perf. 4,297-4,303 ft., IP: 144 bbl. oil per day through 5/32-in. choke, GOR 511, TP 575 psi., CP 1,150 psi., gravity 47.6°, no water.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) WILDCAT FAILURES

Brooks County: Pan American Production Co. 1 San Juana G. Garcia, in La Encantada Grant, 9 mi. SW of Encino, dry, TD 8,301 ft.

Duval County: Cox & Hamon & Coates 1 Biller Chapa, in M. Chapa Sur. 11, 1 mi. SW of Poquita Creek field, dry, TD 2,526 ft.

Hidalgo County: Placid Oil Co. 1 W. M. Doughty, in San Salvador del Tule Grant, 9½ mi. NW of Faysville and 2 mi. SW of San Manuel, dry, TD 9,030 ft.

Kenedy County: Humble B-4 John G. Kenedy, Jr., Blk. 12, Kenedy Pasture Co.

First addn. to Sarita Township, El Paistle Grant, dry, TD 2,402 ft.

McMullen County: Cox & Hamon A-1 Hagist Ranch, Inc., G. B. McKinney Sur. 481, A-1147, 1 mi. SW of Loma Alta field, dry, TD 1,025 ft.

Nueces County: A. H. Masiran 1 Joseph Philarczyk, Blk. 28, Mantor-Briggs-Kuykendall Subd., 4 mi. NW of Banquete townsite, dry, TD 6,298 ft.

Starr County: J. W. Reynolds 1 Antioco Munoz, in El Javali Grant, ½ mi. W of Guerra field, 27 mi. N of Roma, dry, TD 2,730 ft.

Zapata County: Coastal Refg., Inc., & W. D. Kennard 1 Alfonso Garcia, in Lot 1, Hoffer Subd. of Share B, Charco Redondo Grant, 1½ mi. W of Chargo Redondo field, dry, TD 906 ft.

O. W. Killam 2 Wroe, 6 mi. SW of Cuevitas & 3 mi. SE of Charco Redondo field, in S. A. Golden Sur. 633, dry, TD 2,506 ft.

Zavala County: A. J. Bankhead 1 Paul Alley, in James Crabtree Sur. 30, 3½ mi. NE of Batesville, dry, TD 3,934 ft., top Edwards lime 3,929 ft.

Magnolia Petr. Co. 1 Roy Capps, in A. N. Hollingsworth Sur. 2, 6 mi. NE of Batesville, dry, TD 3,894 ft.

SOUTH LOUISIANA

New Producing Sand Is Opened at Pecan Lake

NEW ORLEANS.—A new gas-condensate producing sand has been opened at Pecan Lake, Cameron Parish, by Superior Oil Co. B-6 Miami Corp., in Section 30-14s-3w. Total depth is 11,804 ft., with completion at 10,488-10,505 ft. On potential, through ¼-in. choke, the well flowed 56.76 bbl. of 47.6°-gravity condensate and 4,980,000 cu. ft. of gas per day. Flowing pressure tubing was 3,990 psi. Gas-condensate ratio 61,135. Four productive sands were tested. Initial test in deepest pay, 10,805-17 ft., flowed 4,580,000 cu. ft. of gas per day; no gage on condensate. Second test at 10,650-64 ft., on drill-stem, using 18/64-in. and ½-in. chokes, flowed 65 bbl. condensate and 5,540,000 cu. ft. gas daily, flowing pressure 3,600 psi. Drill-stem test in third pay at 10,570-82 ft. resulted in 65 bbl. condensate and 4,980,000 cu. ft. gas daily, gravity 46.4°. The discovery flows gas-condensate from 8,193-98 ft., and the confirmation well completed at 10,154-64 ft.

Sun Oil Co. 1 Swift, wildcat test in South Melville area of St. Landry Parish, continues to test. Located in Section 23-4s-7e, 2½ miles southwest of Melville townsite, and 10 miles north of Krotz Springs production, total depth 12,500 ft. A slight blow was encountered on drill-stem test through perforations at 11,798-11,806 ft. A satisfactory test has not been made and operators are preparing to squeeze off all perforations from 11,730-11,732 ft. and will reshoot the pipe for another test in this level.

The Texas Co. set and cemented a string of 5½-in. casing at a depth of 15,003 ft., in the 1 State Leases 919-Leeville, a deep west flank test on the Leeville Dome in Lafourche Parish. In Township 21s-22e, in Hackberry Bay, total depth is 15,003 ft. Operators are waiting on cement prior to tests in the deep zone.

SOUTH LOUISIANA SUCCESSFUL WILDCAT

Terrebonne Parish: New gas pool, Bay Baptiste—Union Producing Co. A-1 La Terre-State Unit, 42-19s-19e, 1 mi. SW of South Lirette discovery well, 3 mi. S of Librette field production, TD 11,997 ft., top sand 10,503 ft., perf. 10,503-511 ft., IP: 4,754,000 cu. ft. gas per day through ¼-in. choke.

SOUTH LOUISIANA WILDCAT FAILURES

Calcasieu Parish: Union Sulphur Co., Inc., 1 A. R. West, Choupique area, 16-11s-10w, 4 mi. W of Moss Lake field, dry, TD 9,491 ft.

Vermilion Parish: Stanolind O. & G. Co. 2 E. M. Watkins, 1-14s-2w, 4 mi. S of Florence townsite, dry, TD 13,159 ft.

KANSAS

New Pool Opener For Rooks County

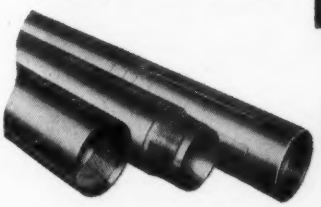
NADEL & GUSSMAN 1 Baldwin, NW NW NW 30-9s-20w, near the west line of Rooks County, has been completed as an Arbuckle discovery well with an Echometer potential of 1,226 bbl. per day. The Arbuckle was called at 3,868 ft. and casing was set on top of the formation. Total depth, is 3,872 ft. The well is about 1 mile east of the south portion of Morel pool which is outlined on the east by dry holes. It is about 4 miles west of Northampton pool that was opened last March by a maximum Arbuckle well.

The north offset to the opener of White Cotton pool in Sedgwick County is showing for a good well. The well, J. P. Gaty 1 Ratzlaff, SE SW SE 19-26s-2e, had a fillup of 1,000 ft. of oil in 20 minutes from Burgess sand pay at 2,952-57 ft. Gaty has staked a northeast offset to the discovery well at 1 Tajaden, SW SW SE 19-26s-2e.

Delta Production Co. and B. & R. Drilling Co. have completed 1 Kelly, NW NW SE 35-23s-12w, Stafford County, with a temporary potential of 84 bbl. per day from the Arbuckle at 3,870-74 ft. Well is about 2 miles north of Stafford pool.

Westgate-Greenland Oil Co. has staked a rank wildcat in Gove County at 1 Benson, NE NE NW 6-14s-30w, about 40 miles

Christensen Diamond Products Company supplies the petroleum industry with all three:



DIAMOND CORE BITS

CORE BARRELS

FIELD SERVICE

One uniform product standard . . . plus competent assistance in the field by trained servicemen assure you always

LESS COST PER FOOT when you choose Christensen to do the job.

LESS COST PER FOOT CHRISTENSEN DIAMOND PRODUCTS

CHRISTENSEN DIAMOND PRODUCTS CO.

1975 South 2nd West • Phone 6-8738 • Salt Lake City, Utah

northeast of Shallow Water pool in Scott County.

KANSAS SUCCESSFUL WILDCAT

Greenwood County: Ward McGinnis 1 Rhodes, NE NE SE 32-25s-11e, pumped 15 bbl. of oil per day from Mississippian at 1,971-89 ft., TD 2,075 ft.

KANSAS WILDCAT FAILURES

Barton County: E. H. Adair 1 Senka, SE SE SW 29-17s-12w, dry, TD 3,430 ft., anhydrite 945 ft., Lansing 3,126 ft., cherty conglomerate 3,377 ft., Simpson 3,382 ft., Arbuckle 3,386 ft.

Chase County: Ward McGinnis et al 1 Underwood, NE NW SE 13-22s-9e, dry, TD 2,635 ft., Mississippian 2,585 ft.

Cowley County: Andy Krow 1 Ableson, NE NW NE 5-32s-5e, dry, TD 2,468 ft., Layton 2,330 ft.

Ellis County: S. A. Murphy et al 1 Hagen, SW SW NW 17-12s-19w, dry, TD 3,939 ft., anhydrite 1,645 ft., Heebner 3,504 ft., Kansas City 3,524 ft., Lansing 3,545 ft., basal Kansas City 3,803 ft., Arbuckle 3,903 ft.

Lincoln County: Harry Miller 1 Buszick, NW NE NW 27-12s-9w, dry, TD 1,542 ft., Ft. Riley 1,262 ft.

Rice County: Birmingham and Bartlett 1 Odgen et al, SE SE SE 4-18s-9w, dry, TD 3,311 ft., anhydrite 890 ft., Heebner 2,749 ft., Lansing 2,895 ft., Simpson shale 3,241 ft., Simpson sand 3,255 ft., Arbuckle 3,310 ft.

L. N. Collins and C. L. Price et al 1 Dressel, NE NE NE 12-19s-9w, dry, TD 3,459 ft., Kansas City 2,920 ft., basal Kansas City 3,210 ft., conglomerate 3,265 ft., Viola 3,295 ft., Simpson shale 3,403 ft., Arbuckle 3,456 ft.

J. C. Dozier et al 1 Armstrong, NW NW NW 11-20s-10w, dry, TD 3,398 ft., anhydrite 437 ft., Lansing 3,034 ft., conglomerate 3,336 ft., Arbuckle 3,371 ft.

Rooks County: Petroleum, Inc., 2 Desmarteau, W/2 NW SW 29-9s-19w, dry, TD 3,659 ft., Heebner 3,318 ft., Lansing 3,360 ft., conglomerate 3,607 ft., Arbuckle 3,615 ft.

Bridgeport Oil and Champlin Refining 1 Wauker, SW SW NW 8-10s-20w, dry, TD 3,878 ft., anhydrite 1,755 ft., Lansing 3,532 ft., conglomerate 3,802 ft., Simpson shale 3,839 ft., Simpson dolomite 3,842 ft., Arbuckle 3,853 ft.

Stafford County: Musgrove Petroleum et al 1 McMillan, NW NW NW 17-24s-12w, dry, TD 4,115 ft., Heebner 3,333 ft., Lansing 3,405 ft., Kansas City 3,498 ft., conglomerate 3,853 ft., Viola 3,876 ft., Simpson 4,003 ft., Arbuckle 4,065 ft.

Huber Corp. and Harbar Drilling 1 Coen, SE SE SE 15-23s-14w, dry, TD 4,045 ft., Heebner 3,395 ft., Toronto 3,416 ft., basal Oread 3,432 ft., Lansing 3,549 ft., basal Kansas City 3,792 ft., conglomerate 3,863 ft., Viola 3,877 ft., Arbuckle 4,013 ft.

Wabaunsee County: Amerada Petroleum Co. 1 Enlow, SW SW SE 33-10s-10e, dry, TD 2,750 ft., no tops reported.

MISSOURI WILDCAT FAILURE

Platte County: Cities Service Oil Co. 1 Jones Est., SE NW NW 29-51n-34w, dry, TD 1,828 ft., basal Kansas City 325 ft., Cherokee 565 ft., Mississippian 1,020 ft., Kinderhook 1,422 ft., Hunton 1,452 ft., Viola 1,615 ft., Simpson shale 1,963 ft., Simpson sand 1,714 ft., Arbuckle 1,772 ft.

Designed especially for "tough going," **AMERICANS** have what it takes to render smooth, dependable service in heavy industrial applications. Strong, precision built, longer lasting, they will minimize your anti-friction bearing problems. Our technical staff will assist you in selecting the right bearings for your needs. Write.

AMERICAN ROLLER BEARINGS HEAVY DUTY

AMERICAN ROLLER BEARING CO.
420 Melwood Street Pittsburgh, Pa.

Pacific Coast Office: 1718 S. Flower St., Los Angeles, Calif.

MICHIGAN

State Offers Large Area For Wildcat Leasing

SAGINAW.—In the largest offering it has made, the Michigan Conservation Department has put nearly 141,000 acres of state-owned land up for bidding this week end for oil and gas rights. The auction includes land in 20 counties, all wildcat with the exception of three small proven plots in Crawford and Mason counties. The offerings are in the following counties: Barry, Clare, Crawford, Gladwin, Grand Traverse, Isabella, Kalkaska, Lake, Mackinac, Manistee, Mason, Mecosta, Midland, Missaukee, Newaygo, Oceana, Osceola, Roscommon, and Wexford.

Field operations in the past week were generally disappointing with 11 wildcat dry holes in the list of 24 completions. Only six small producing wells and two gas wells were reported and there were five dry holes in so-called proven areas. Exploration showed no signs of abating, however, as operators announced 31 new locations in 17 counties.

The new wells produced initially at from 10 to 100 bbl. a day. Failures included a Gladwin County operation abandoned at 5,215 ft.; another at 4,601 ft. is in Isabella County.

MICHIGAN WILDCAT FAILURES

Allegan County, Clyde Township: Ohio Oil Co. 1 William A. Nash Estate, NE NE SW 32-2n°-5w, dry in Traverse limestone, TD 1,235 ft.

Hopkins Township: Lloyd C. Green 1 Harley Sebright, SE SW SW 30-3n-12w, dry in Traverse limestone, TD 1,598 ft.

Martin Township: P. Gortsema and J. Myer 1 Grace Bouwman, SE SE NW 17-2n-16w, dry in Traverse limestone, TD 1,727 ft.

Gladwin County, Sage Township: Sun Oil Co. and Pure Oil Co. 1 Otto Sherman, SW NW NE 6-19n-2w, dry, TD 5,217 ft.

Ionia County, Orleans Township: Leonard Oil Co. and Wilson Petroleum Co. 1 Catherina Wacha, NE SE SE 14-8n-7w, dry in Dundee, TD 3,045 ft.

Newaygo County, Norwich Township: Daily Crude Oil Co. 1 H. Shelhamer, NE NE SW NE 4-5n-4w, dry in Traverse limestone, TD 2,859 ft.

Osceola County, Richmond Township: H. E.

Bell 1 R. E. Vincent, NW SW SE 32-17n-10w, dry in Detroit River, TD 3,725 ft.

Ottawa County, Zeeland Township: Pascal F. Broughton 1 Edward Bellinger, SW SW NE 4-5n-4w, dry in Traverse limestone, TD 1,877 ft.

Tuscola County, Wisner Township: E. Edwin Brehm 1 Roy R. Black et al, SW NW SE 24-14n-7e, dry in Dundee, TD 3,472 ft.

Van Buren County, Hamilton Township: Leonard C. Sleep 1 Miles and Laura Moden, NW SW SE 3-4s-15w, dry in Traverse limestone, TD 1,008 ft.

Keller Township: Ohio Oil Co. 1 Pauline Klett, NW NW SE 33-4s-16w, dry in Traverse limestone, TD 925 ft.

OKLAHOMA

Grady County Wildcat Makes Oil and Gas

GRADY County has a pool opener at Gulf Oil Corp. et al 1 Mainka, NW NW NE 12-5n-5w, near the eastern border of the county and on a line that is a continuation of the Golden Trend of Garvin and McClain counties. The well was drilled to a total depth of 13,250 ft. and casing set at 13,137 ft. On early test, the well filled a 100-bbl. tank with load water and same oil in 75 minutes and had gas estimated at 10,000,000 cu. ft. Additional tanks were installed and the well was reported to be flowing about 40-50 bbl. of oil per hour through ¾-in. choke with gas estimated at 8,000,000 cu. ft. Current testing is in the lower Bromide but the well had several shows, indicating possible commercial production above the point where the casing is set. The well is about 4 miles northwest of North Lindsay pool.

The prospective gas and distillate discovery well in Kingfisher County, Superior Oil Co. 88-16 Long, SE SE SE 16-17n-7w, showed an estimated 8,000,000 cu. ft. of gas and recovered 100 ft. of distillate on a drill-stem test of the Viola at 8,577-8,636 ft. The recovery included no water. The top of the Viola was called at 8,468 ft. Early drill-stem tests of the Hunton showed gas and distillate near the top but had salt water below 8,080 ft. The base of the Hunton was called at 8,364 ft.

Mid-Continent Petroleum Corp. is completing the Pawnee County wildcat, 1 L. M. Robinson, SE SE NW 1-20n-6e. Casing was set at 2,990 ft. on top of the Tucker sand and hole was bottomed at 3,025 ft. Pay was given a 155-qt. shot, and well swabbed 51 bbl. of oil in one of the 24-hour testing periods but was finaled for 25 bbl. per day.

OKLAHOMA SUCCESSFUL WILDCATS

Hughes County: Sherrod 7 Barnard, SE SW NW 24-8n-8e, pumped 21 bbl. of 38°-gravity oil per day from Booch at 2,810-30 ft., TD 3,317 ft.

Okfuskee County: Mid-Continent 1 Harmon, NW SE SE 33-13n-10e, flowed 121 bbl. of 38°-gravity oil per day from Gilcrease at 2,960-72 ft., TD.

Oklahoma County: Peppers 1 Keaton, NW NW NE 4-12n-2w, flowed 85 bbl. of oil per day by heads from Bois d'Arc at 6,256-92 ft., TD 6,336 ft.

OKLAHOMA WILDCAT FAILURES

Carter County: Sun 2 Miller, SW SE NW 8-1s-3w, dry, TD 1,236 ft.

Cotton County: Hutcheson 1 Dickson, SW SW NE 12-3s-13w, dry, TD 3,005 ft., Arbuckle 2,798 ft.

Hamilton 1 Mills, SW SW NW 10-5s-12w, dry, TD 2,005 ft., hard sand 1,110-20 ft., sand 1,385-90 ft., fusilinid lime 1,570-75 ft., hard sand 1,650-55 ft., sand 1,780-1,805 ft., Megargel lime 1,805-24 ft.

Norwood 1 Warren, NE NE SE 2-5s-13w,

GET THE FACTS WHEN YOU BUY COMPOUNDS

Men who know the problems of correct fabrication for threads agree that, to provide proper thread protection, compounds must have sufficient "body" to prevent the thread surfaces from coming into contact at maximum pressure. Maximum thread protection is provided by a compound with a low coefficient of friction and maximum fluidity consistent with the body required. It should be non-hardening. It should be free of a tendency to "gum up." It should be free of acid qualities and other corrosive agents. WECO Thread Compounds meet all these requirements. That's why WECO is your best thread protection. Get the facts and compare WECO Compounds . . . point by point . . . with any other compound!

WECO Steel-Aid . . . contains 67% pure metallic lead and is made specifically for drill collars and tool joints. Metallic Base WECO Steel-Aid will not squeeze out under high torque pressures encountered in these services.

WECO No-Gall . . . contains more than 50% pure metallic zinc, providing operators with a compound that gives tool joint threads maximum protection. Research and actual use have proved WECO No-Gall affords maximum tool joint efficiency.

WECO Hi-Speed Seal . . . a permanent, non-hardening seal universally accepted for casing and tubing threads, steam lines, and oil and gas lines. Hi-Speed Seal is widely used in butane, propane, gasoline and other petroleum services. Unaffected by temperatures to 600° F.

WELL EQUIPMENT MFG. CORP.
Subsidiary of Chiksan Company
Houston 1, Texas
Exclusive Sales Representative Outside Mid-Continent Area
CHIKSAN COMPANY
Brea, Calif. New York 7
Export Sales: CHIKSAN EXPORT COMPANY, Brea, Calif. New York 7

WECO
Manufacturers and Distributors of Oilfield, Refining, Marine and Industrial Equipment

dry, TD 2,000 ft., sands 1,000-20 ft., 1,105-25 ft., 1,192-1,303 ft., 1,330-40 ft., 1,347-70 ft., 1,467-77 ft., 1,608-15 ft. and 1,719-34 ft., broken sand 1,925-30 ft., brown sand 1,930-48 ft., lignite 1,949-51 ft., sand 1,951-59 ft. and 1,969-94 ft.

Garvin County: Cities Service 1 Biffle "B," NW SE NW 24-3n-2w, dry, TD 5,729 ft., bromide dense 5,508 ft., first bromide sand 5,610 ft.

Sohio 1 Rodke, C SE NW 23-1n-2w, dry, TD 9,507 ft.

Jefferson County: Ross 1 Marlett, SE SW SW 8-5s-8w, dry, TD 1,942 ft., fusilinid lime 1,580-92 ft., Megarlel lime 1,864-68 ft.

Kiowa County: Miller 1 Irwin, C NE NW 12-6n-16w, dry, TD 1,602 ft. in Viola.

Noble County: Robinson 1 School Land, NW SE NE 36-24n-2w, dry, TD 4,538 ft., Hoover 2,080 ft., Oread 2,158 ft., lime 2,555-73 ft., Tonkawa 2,680 ft., sand 2,975-3,020 ft., Layton 3,376 ft., Big lime-Oswego 3,857-4,055 ft., Mississippi lime 4,285 ft., Woodford 4,428 ft., Viola 4,452 ft., Simpson 4,490 ft., second Wilcox 4,497 ft.

Howell 1 Cockrell, NE NE SW 5-23n-1e, dry, TD 4,939 ft., Tonkawa 2,590-2,620 ft., sand 2,695-2,755 ft., Layton 3,542-3,635 ft., Checkerboard 3,880 ft., Oswego 3,884 ft., Skinner 4,181-4,228 ft., no Bartlesville, Mississippi chat 4,462 ft., Mississippi lime 4,494 ft., Viola 4,808 ft., Wilcox 4,868 ft., second Wilcox 4,904 ft.

Pawnee County: Yingling 1 Nichols, NW SE NW 12-20n-5e, dry, TD 3,225 ft.

Pontotoc County: Soverign 1 Stonecipher, SE SE NW 7-4n-4e, dry, TD 1,987 ft.

Pottawatomie County: Gulf 1 Caplan, SW SW NE 35-9n-2e, dry, TD 5,708 ft.

Stephens County: Atkinson 1 Brown, SW NE SW 3-3s-6w, dry, TD 2,266 ft., sand 2,166-2,212 ft., lime 2,212-63 ft.

"... that job was done by specialists"

Sapulpa Tank Company is a recognized specialist in the field of steel tank erection, field fabrication, repairing and dismantling. The combination of skilled workmen, modern equipment, adequate facilities, and expert service assure more economical tank jobs of higher quality.

In more than fifteen years of rendering expert tank service, Sapulpa Tank Company has acquired a broad knowledge of the many problems in tank construction and maintenance. Because of close supervision and efficient operations, we are able to effect greater economy for our customers.

Let a Sapulpa Tank representative discuss our service with you in conjunction with your next storage requirement.

NEW TANKS
FIELD FABRICATION
TANK REPAIRING

SAPULPA TANK COMPANY
TANK CONTRACTORS
P. O. BOX 218 SAPULPA, OKLAHOMA
BRANCH OFFICE, FT. WORTH, TEXAS

ROCKY MOUNTAIN

Utah Gets Its Third Oil Discovery Within a Month

DENVER.—A third discovery of oil in Utah in the past month was made last week with the recovery of oil on a shallow test in the Boundary Butte area, San Juan County, by Western Natural Gas Co., Byrd-Frost, Inc., et al. The well is 2 English, SE SE NW 22-43s-22e, and went to 1,514 ft., total depth, with casing cemented at 1,492 ft. Top of the Coconino is reported at 1,490 ft. and the operator bailing approximately 6 bbl. of 42.7°-gravity oil per hour. Production has been estimated at 40 bbl. of oil daily. Testing is continuing and the well will probably be completed at its present depth, and a development drilling program to the Coconino oil zone will be started by the operators. The discovery of oil in the Coconino in the present well is the first report of oil production from this structure, although the same operators made a gas discovery in this field early this year, and are now drilling an extension Hermosa formation gas well.

Activities in the southern part of Utah have increased since the discovery of oil by The California Co. at its Upper Valley wildcat at 1 Unit, C SW NW 12-36s-1e, Garfield County, 2 weeks ago. Tubing has been recovered and California has run casing in the well prior to drilling deeper in the formation. Production, estimated at more than 200 bbl. of 17°-gravity oil daily, is from a Pennsylvanian limestone between 8,777-91 ft., total depth.

At Melstone, Mont., Amerada Petroleum Co. and General Petroleum Co. are now completing a Kibbey sand flowing well at 1 Hougen, C SE SE 23-10n-29e. The well flowed 222 bbl. of clean oil in 11 hours after casing was run. Kibbey was encountered between 4,185-4,228 ft.

Following discovery of oil in Fiddler Creek area a week ago activity on the east side of the Powder River Basin in Wyoming has increased. Three new locations have been announced and may be extensions to the Newcastle producing formation as established at Clark Drilling Co. et al discovery at 1 Whitcell, NW NE SW 19-46n-64w, Weston County. This well flowed 53 bbl. of oil per hour through ¾-in. choke in 40 minutes and then selttled to 26 bbl. per hour through ½-in. choke, on a 16-hour test. Newcastle was found between 4,502-52 ft. and the oil is 48° gravity. Development drilling is continuing at a rapid pace in the Mush Creek-Skull Creek areas, 10 miles southeast of Fiddler Creek, where there are now approximately 90 wells producing from the Newcastle with a daily average production of 4,500 bbl.

WYOMING SUCCESSFUL WILDCAT

Wild Horse Butte: Barney Cockburn et al 1 Hale, C SE SW 2-42n-93w, TD 1,202, pumped 50 bbl. oil per day, acidized with 500 gal., Phosphoria 1,120-80, OW-DD, OTD 1,180.

COLORADO WILDCAT FAILURE

Glade Anticline, Dolores County: Western Natural, Byrd-Frost, P.B. English 1 "A" Glade, CEL SE NE 26-41n-17w, TD 7,680, abnd., Rico 4,080, Hermosa 4,270, Anhydrite 6,010, salt 6,070, Igneous material 7,550, granite 7,590.

White River, Rio Blanco County: Frontier Refining Co. 1 Lad, CWL NW¼ 31-2n-96w, TD 6,410, temp. abnd., Base Wasatch 3,560.

MONTANA WILDCAT FAILURES

Wolf Creek, Carter County: Hunt Oil Co. 2 Gov't., C NW NE 30-8s-57e, TD 1,849, abnd., Muddy 1,525-65, Dakota 1,835.

Howard Coulee, Musselshell County: Texas 1-C N.P.R.R., C SW SE 13-11n-27e, TD 5,664, abnd., Amsden 3,195, Heath 3,688, Kibbey 4,218, Charles 4,425, Madison 5,055, Devonian 5,220.

NORTHERN NEW MEXICO WILDCAT FAILURES

French Mesa, Rio Arriba County: Skelly Oil Co. 1 Crittenden, C SE NW 35-24n-1e, TD 4,846, abnd., Pennsylvanian 2,450, granite 4,844.

Nutritas, Rio Arriba County: Southwestern Exploration et al 1-D, SW SW NE 33-28n-4e, TD 1,902, Dakota 1,468, Morrison 1,840.

CANADIAN FIELDS

Socony-Vacuum Begins Test on Alberta Plains

CALGARY. — Socony-Vacuum Exploration Co. is starting its first drilling on the Alberta Plains. About 8 miles north of the town of Craigmyle and 90 miles northeast of Calgary is the site of Socony-Craigmyle No. 1, the company's first exploratory well. Located in LSD 12, 32-32-16w4, the new venture is on a seismograph anomaly about 8½ miles northwest of the nearest previous drilling—Hanna Petroleums Co. Dowling 1, recently completed as a wet gas discovery well from the Sunburst sand.

Bantry.—Standard Oil Co. of California has staked another test at Bantry, 105 miles southeast of Calgary, and about 6 miles southwest of the company's Bantry oil discovery well which completed last January. Since its completion, the discovery well has produced over 12,000 bbl. of 25°-gravity oil. The new wildcat Bantry-CPR No. 75-8-17-13, in LSD 12, 8-17-13w4, is scheduled to commence in the very near future.

Redwater.—Imperial Oil, Ltd., has staked its fourth follow-up well, Redwater 5, in LSD 9, 25-57-22w4, about 2 miles west and ½ mile south of the discovery well. The company's first follow-up well is currently coring below 3,242 ft.

Vermilion. — Western Development Co., subsidiary of Western Leaseholds, Ltd., of Calgary, has staked a test of Lower Cretaceous sands 2 miles northeast of Vermilion and 115 miles east of Edmonton. The well, Western Vermilion 1, LSD 11, 4-51-6w4, is located on a 20,000-acre Crown and C.P.R. reservation a few miles from the Vermilion heavy-crude oil field.

Halfway Lake.—Sunray Oil Corp., Canadian Independents Pacific Petroleums, and Atlantic Oil Co. have joined forces to drill a test 18 miles northwest of Imperial's Redwater discovery well. Pacific-Sunray 1 is to be drilled in LSD 9, 19-59-23w4, about 1½ miles southeast of the post office of Halfway Lake.

Turner Valley.—Operating through 5/16-in. choke, Royalite 73 produced 155 bbl. of oil per day, with a gas-oil ratio between 2,700 and 2,800 cu. ft. per barrel. Royalite 73 was deepened during the past month to discover the deeper Madison lime productive zone, and is now on bottom-hole pressure tests. Open flow potential has not yet been determined, but a good well is indicated by the restricted-flow performance.

A quarter mile east offset to Royalite 73 has been staked by Royalite Oil Co. in LSD 12, 23-20-3w5. The new site, Royalite 89 will commence drilling as soon as one of the company's rigs is released from its current drilling operations in this area.

Leduc.—Open-flow potentials have been determined at two more Imperial Oil Co. completions at Leduc. Imperial-Leduc 111, D3 zone completion in LSD 14, 15-50-26w4 (at 5,368 ft. total depth), rates potential of 1,917 bbl. daily on basis of an 8-hour flow test. Imperial-Leduc 104, D2 zone completion at 5,141 ft. in LSD 5, 15-50-26w4, rates potential of 1,296 bbl. daily on basis of a 5-hour flow test.

Lloydminster.—In the Lloydminster area, Phillips Petroleums, Ltd. (Canadian independent), has success indicated at its first wholly owned test. Phillips-Pete 1, LSD 5, 10-49-27w3, completed drilling at 1,893 ft. and has set 7-in. casing at bottom. Oil saturation showed in three oil zones in the Sparky-General horizons of the Lower Cretaceous. While no drill-stem tests were made, the backers are hopeful of commercial production after zones have been opened by gun-perforation.

APPALACHIAN FIELD

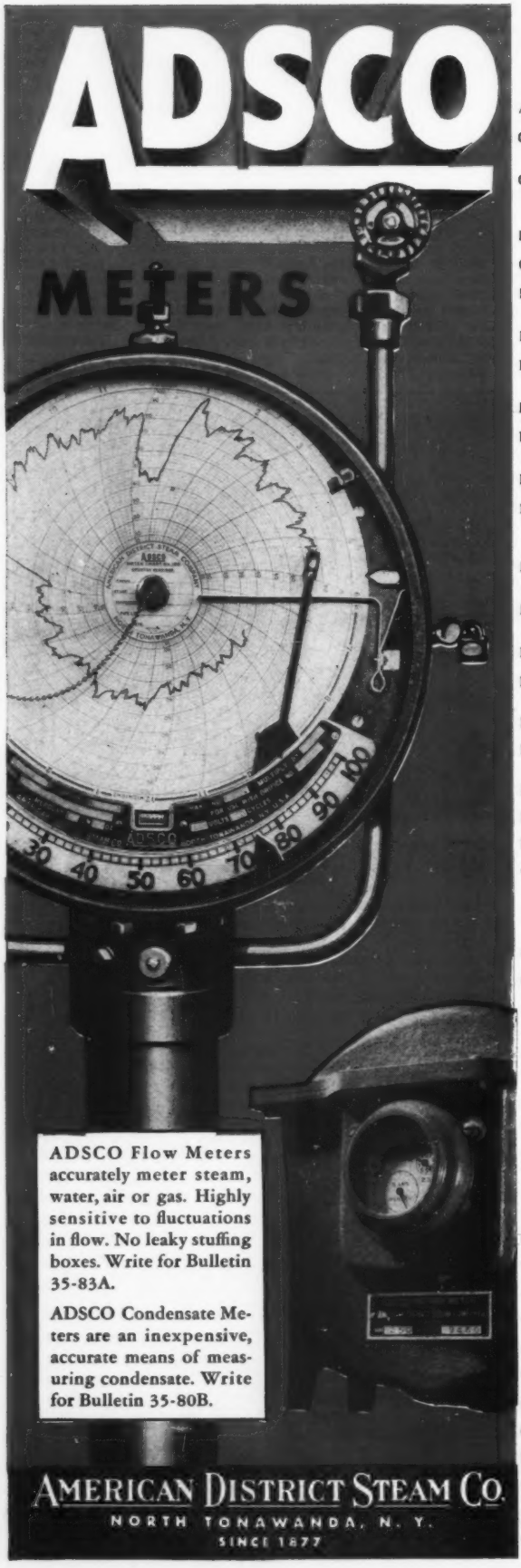
Gas Well Extends Waterbury Pool

PITTSBURGH.—In Grant district, Jackson County, West Virginia, Hope Natural Gas Co. 9,230 Lee Batten, elevation 851 ft., went through the Clinton sand at 6,366 -6,400 ft. and is drilling at 6,415 ft. with no show of gas in this section. Godfrey L. Cabot, Inc., 1,281 John Hague, elevation 998 ft., in Steele district, Wood County, was completed in the Oriskany sand gaging 103,000 cu. ft. of gas after shot. These wells are in the Waterbury discovery well pool. In Portland district, Preston County, Wm. E. Snee is rigging up to deepen the 3 James F. Sisler, elevation 2,036 ft. This well was originally drilled to the Onondaga chert and will now be taken down to the Oriskany sand.

New locations totaled 35: Union district, Barbour County; Sherman district, Boone County; Otter district, Braxton County; Barboursville district, Cabell County; Sheridan and Sherman districts, Calhoun County; Pleasant district, Clay County; Ravenswood district, Jackson County; Elk district, Kanawha County; Harts Creek district, Lincoln County; Union district, Marion County; Webster district, Marshall County; Butler, Grant, Lincoln and Union districts, Wayne County; Clay and Reedy districts, Wirt County; Harris, Lubeck and Williams districts, Wood County.

In Derry Township, Westmoreland Coun-

SOLVING MUD PROBLEMS
Case History #3
YALE UNIONS
Conventional
Misaligning
Yale Conventional and Misaligning Unions are designed and manufactured for water, mud, oil, steam and gas service under a wide range of pressures.
The Yale Conventional Union incorporates a synthetic, oil resistant "O"-Ring assuring positive pressure seals. These "O"-Rings will last indefinitely and will seal against recommended pressures even if mating surfaces of the union become damaged.
The Yale Misaligning Union is designed for use on rotary hose connections, mud lines, headers, pipe lines and other installations subject to expansion and vibration. This union permits up to 7½ degree lateral movement. Pressure seals are positive, without excessive tightening of the connecting nut, so that a certain amount of "swivel" is retained in the union.
DETAILED INFORMATION ON REQUEST
"ONLY MUD" DRILLING MUDS, CHEMICALS—MUD EQUIPMENT
MP INC.
MUD PRODUCTS, INC.
PHILTOWER BLDG.
TULSA 3, OKLA.


ADSCO
METERS
ADSCO Flow Meters accurately meter steam, water, air or gas. Highly sensitive to fluctuations in flow. No leaky stuffing boxes. Write for Bulletin 35-83A.
ADSCO Condensate Meters are an inexpensive, accurate means of measuring condensate. Write for Bulletin 35-80B.
AMERICAN DISTRICT STEAM CO.
NORTH TONAWANDA, N. Y.
SINCE 1877

ADSCO

Representatives in Following Cities

ALABAMA
Birmingham 3-1495
CALIFORNIA
Los Angeles Capitol 1-2125
San Fran. Exbrook 4000
COLORADO
Denver Keystone 5111
Grand Junction 2242
Pueblo 2085
DIST. OF COLUMBIA
Wash. Republic 6116
GEORGIA
Atlanta Lamar 3871
ILLINOIS
Chicago Andover 7050
Moline 1557
INDIANA
Indianapolis Riley 1926
IOWA
Cedar Rapids 3-3527
Des Moines 4-3231
KENTUCKY
Louisville Shawnee 9026
LOUISIANA
New Orleans Ray. 7984
Shreveport 7-7741
MARYLAND
Baltimore Plaza 7334
MASSACHUSETTS
Boston Hubbard 2-8352
Long Meadow Springfield 2-6382
MICHIGAN
Detroit Tyler 7-6322
Kalamazoo 3-2567
MINNESOTA
Duluth Melrose 3394
St. Paul Garfield 5811
MISSISSIPPI
Jackson 4-7689
MISSOURI
Kansas City Har. 1737
St. Louis Forest 0400
NEBRASKA
Omaha Jackson 7636
NEW YORK
N. Y. Penn. 6-0277
Syracuse 4-8597
NORTH CAROLINA
Charlotte 3-7726
NORTH DAKOTA
Fargo 4291
NEW MEXICO
Albuquerque 5584
OHIO
Cincinnati Univ. 0422
Cleveland Prospect 4108
Columbus Evergreen 7839
Dayton Fulton 9114
Middletown 2-6367
OKLAHOMA
Tulsa 4-2908
OREGON
Portland Atwater 3875
PENNSYLVANIA
Phila. Locust 4-2090
Pittsburgh Atla. 6083
RHODE ISLAND
Providence Dexter 4700
SOUTH CAROLINA
Greenville 2538
SOUTH DAKOTA
Sioux Falls 5811
TENNESSEE
Knoxville 3-9219
TEXAS
Dallas Harwood 5271
El Paso Main 1787
Houston Hadley 9574
Lubbock 2-4330
San Ant. Lambert 2-9681
UTAH
Salt Lake City 4-6421
WASHINGTON
Seattle Eliot 4425
WEST VIRGINIA
Charleston 67-142
WISCONSIN
Milwaukee Kilb. 8210
WYOMING
Casper 1656
MANITOBA, CANADA
Winnipeg 23-341
ONTARIO, CANADA
Toronto Rand. 3166
QUEBEC, CANADA
Montreal Lanc. 1823
HAWAII
Honolulu 6401
PUERTO RICO
San Juan 2-8475
ARGENTINA
Buenos Aires Belgrano 964
MEXICO
Mexico City 18-56-08

ty Pennsylvania, Peoples Natural Gas Co. 3,814 Camilla Giffin, elevation 2,238 ft., was drilled through the Oriskany sand at 7,392-7,453 ft. with no gas showing. Drilling is continuing and has reached a depth of 7,455 ft. In Georges Township, Fayette County, Orville Eberly et al 1 John Dulick, elevation 2,415 ft., with shows of gas in the Oondaga chert, topped the Oriskany sand at 7,249 ft. and had shows of gas at 7,253 ft. and 7,263 ft., with drilling now at 7,268 ft.

There was one new location in West Bethlehem Township, Washington County.

WEST VIRGINIA SUCCESSFUL WILDCAT

Wood County, Steele district: Godfrey L. Cabot, Inc., 1,281 John Hague, elev. 906 ft., 103,000 cu. ft. of gas after shot, Corniferous lime 4,986 ft., Oriskany sand 5,087-5,131 ft., gas 5,089-94 ft., TD 5,153 ft.

LA.-ARK.

New Distillate Pay Hit in Hico-Knowles

SHREVEPORT.—The California Co. 1 T. L. McCrary Unit B-31, 14-19n-4w, had an increase in distillate yield last week and now appears to be a major addition to Hico-Knowles field of Lincoln Parish, where it has opened a new pay horizon in the Cotton Valley formation. An earlier report on a test of perforations at 8,912-24 ft. showed a yield of 185 bbl. of 62.7°-gravity distillate. On last report the well was said to have flowed for a week, making 800 bbl. of distillate a day, through ½-in. choke. Gas volume was still estimated at 8,500,000 cu. ft. daily, open flow.

In Claiborne Parish, Hunt Oil Co. 1 A. O. Goodwin, 21-23n-7w, prospective Smackover gas-distillate discovery estimated at 80,000,000 cu. ft. daily through 5/32-in. choke, had found the casing split at 1,323-24 ft. and was replacing a section. Total depth is 10,575 ft. Delta Drilling Co. 1 J. T. Meadows, 1-22n-7w, was drilling below 10,250 ft. in the Cotton Valley. M. A. Halsey 1 Bishop-Lewis Unit, 30-20n-6w, Athens field deep test, ran electric log to total depth at 9,523 ft., set 5½-in. casing on bottom and is waiting on cement. It logged the Cotton Valley black shale at 8,000 ft., "B" sand zone, with gas shows, at 8,247-64 ft., "D" sand, tight, at 8,347-70 ft., Bodcaw sand with gas shows at 8,416-74 ft., Vaughn sand with gas shows, 8,506-52 ft., and the Davis sand from 8,663-8,713 ft. Elevation is 351 ft.

Hunt Oil Co. 5 Louisiana Delta, 23-4n-5e, Catahoula Parish, 11,000-ft. wildcat, was in the Cretaceous at 10,201 ft. and drilling ahead.

V. V. Bull 1 Fred Huenfeld, 29-18n-5e, Ouachita Parish 3,500-ft. wildcat, was drilling below 3,642 ft., and reported going to 4,200 ft. The California Co. 2 Maxey, 33-18n-1e, had total depth at 8,873 ft. in the Cotton Valley and set packer at 9,562 ft. with perforated tail pipe below to test open hole from 9,580-9,873 ft. On ½-in. tubing choke, it was making an estimated 2,500,000 cu. ft. of gas a day from the Burgess-Simmons section, on a flowing tubing pressure of 100 psi.

Skelly Oil Co. 1-B Whitney Corp., 4-9n-14w, Sabine Parish, ran a drill-stem test of the Hill zone of the Rodessa, from 5,231-42 ft. Gas surfaced in 63 minutes, with about 12 psi. top pressure, and in 74 minutes the recovery was 2,500 ft. of salt water. It was drilling ahead below 5,457 ft. in the lower Glen Rose.

In Webster Parish, Barnsdall Oil Co. 1 Syke, 1-22n-9w, drilled ahead below 10,383 ft. Hunt Oil Co. 1 R. P. Campbell, 14-23n-10w, drilled below 10,386 ft. Stanolind and Continental 1 Mitchell, 31-23n-9w, remained at 11,295 ft. fishing drill pipe.

In Ashley County, Arkansas, Superior Oil Co. of California 1 Bradley, 11-19s-10w, swabbed 30 bbl. of 23°-gravity oil from

Cotton Valley perforations at 5,874-80 ft., then perforated in the Smackover at 6,038-43 ft., where a 25-minute drill-stem test recovered salt water with a show of oil.

In Chicot County, R. B. Smith 1 Yarbrough, 6-17s-1w, was drilling at 3,350 ft. McAlester Fuel Co. 1-A Polk, 19-15s-20w, new College Hill field, Columbia County, was drilling at 5,014 ft. Honolulu Oil Corp. 1 Anderson-Tully, 14-9s-1w, Desha County, was drilling below 4,255 ft. Stanolind 1 Bodcaw, 29-19s-23w, Lafayette County, was drilling sand and shale at 10,626 ft. Stanolind 1 Union Saw Mill was below 9,978 ft.

NORTH LOUISIANA WILDCAT FAILURES

DeSoto Parish: J. P. Owen 1 James Scott, 19-14n-12w, dry, TD 3,324 ft., Nacatoch 1,069 ft., base Annona 1,638 ft., Eagleford 2,578 ft., elev. 140 ft.

Red River Parish: British-American 1 J. E. Britnell, 6-13n-8w, dry, TD 3,405 ft., Nacatoch 1,385 ft., Austin 2,870-3,105 ft., Tuscaloosa 3,075 ft., elev 221 ft.

Richland Parish: J. K. Wadley 1 McCoy, 1-16n-6e, dry, TD 4,518 ft.

Tensas Parish: C. H. Osmond 1 Wilkerson, 15-12n-12e, dry, TD 9,801 ft., Massive sand 8,894-8,907 ft., distillate show not commercial.

Union Parish: Dan Lester Oil Co. 1 K. Wade, 17-22n-1w, dry, TD 2,295 ft., Arkadelphia 2,295 ft., Saratoga 2,258 ft., elev. 193 ft. FP.

Winn Parish: H. L. Hunt F-143 Nebo, 24-14n-5w, dry, TD 8,592 ft., elev. 306 ft.

ILLINOIS

White County Wildcat Is Good McClosky Well

MATTOON.—White County has a prospective pool opener about 5 miles southeast of Mill Shoals at Magnolia Petroleum Co. 1 Lloyd Taylor, NW NW NE 31-3s-9e. Operator is testing the McClosky at 3,457-60 ft. and 3,494-3,506 ft. following a 2-hour drill-stem test at 3,458-67 ft. that had gas in 10 minutes and recovered 1,860 ft. of clean oil and 300 ft. of oil-cut mud. Bottomhole pressure was 650 lb. The well also had a show of oil and water at 3,494-3,506 ft. and in the Aux Vases at 3,356-3,412 ft. Total depth is 3,550 ft.

The area in the north central part of Richland County continues to attract interest where Calvert & Willis and Aurora Gasoline Co. 1 Henry Schneider, NW NW NW 4-4n-14w, is showing as a prospective pool opener. A 1-hour drill-stem test of the McClosky at 3,010-14 ft. had gas in 17 minutes and recovered 630 ft. of clean oil, 60 ft. of oil-cut mud, and 30 ft. of salt water. The well is just south of Stringtown and west of Stringtown pool. R. P. Johnson recently completed a north extension to Stringtown pool that had an initial production of 1,724 bbl. per day from the McClosky.

Taylor & Schumacker 1 U. S. Coal & Coke Co., SW NW NW 21-6s-4e, Franklin County, is cleaning out and testing the O'Hara at 3,044-72 ft. Casing was perforated at 3,050-60 ft. and the pay treated with 2,000 gal. of acid. Crew swabbed 12 bbl. per hour. On early tests, the well had swabbed 10 bbl. per hour from the Rosiclare at 3,082-94 ft. and McClosky at 3,130-34 ft.

ILLINOIS SUCCESSFUL WILDCATS

Franklin County: George & Wrather and Aurora Gasoline Co. 1 Wilcox, SE SE SW 20-5s-3e, IP 92 bbl., Hardinsburg, 2,308-18 ft., TD 2,318 ft.

Wabash County: Central Pipeline Co. 1 Stanwell, SE SE NW 30-1n-12w, IP 102 bbl., Biehl sand, 1,602-16 ft., TD 2,466 ft.

ILLINOIS WILDCAT FAILURES

Franklin County: J. T. Bailey 1 Chenault Heirs, NE SE NW 31-5s-3e, dry, TD 2,994 ft.

Superior Oil Co. 1 Hutchcraft, NE NE NW 13-5s-4e, dry, TD 3,395 ft.

Gallatin County: Johnston Drilling Co. 1 C. B. Young, SW NW NE 9-9s-10e, dry, TD 3,021 ft.

Madison County: O. R. Schull 1 Newhaus, SE NE SE 3-5n-7w, dry, TD 617 ft.

F. J. Ellison 1 Iberg, NE SE SE 13-4n-6w, dry, TD 845 ft.

Richland County: Calvert & Willis 1 Wilson, NW NE SW 18-4n-11e, dry, TD 3,226 ft.

F. Bragassa 1 R. Byrne, SW NW SE 15-3n-10e, dry, TD 3,261 ft.

Wabash County: Arvin Drilling Co. and Ashland Oil & Refining Co. 1 Keets, NE NE SW 32-1s-14w, dry, TD 3,037 ft.

Wayne County: Central Pipeline Co. and George Engle 1 Adams, NE SW NE 35-1s-9e, dry, TD 3,461 ft.

Armstrong Oil Co. 1 Carlton, NW NW NE 6-3s-6e, dry, TD 3,385 ft.

White County: Aurora Gasoline Co. 1 Holt, NW NW SE 13-4s-10e, dry, TD 3,189 ft.

C. E. Skiles 1 Spencer, NW NW NW 35-4s-10e, dry, TD 3,147 ft.

EASTERN TEXAS

Travis Peak Is Third Pay for Blackfoot Field

DALLAS.—After lengthy testing, The Texas Co. 1 Hanks, William Albright Survey, was completed for 62.6 bbl. of 44.3°-gravity oil plus 5 bbl. of salt water, to add the Travis Peak sand as the third pay for Blackfoot field of northern Anderson County. The well was drilled to 10,080 ft., then perforated at 9,034-52 ft. in the Travis Peak for completion. It was dry in the Rodessa and Pettit, the other two producing zones in the field. Location is 3,200 ft. northeast of nearest Pettit lime production.

In Cherokee County, Geir-Jackson, Inc., planned a third test for its one-well field 10 miles west of Alto. It is to be the 2

Bottom Water is a costly profit leak

Eagle Lead Wool

***stops* Bottom Water!**

You rule out the risk of oil-wasting bottom water shutdowns when you tamp Eagle Lead Wool in the hole. This finely stranded, noncorrosive metallic wool makes a water-tight plug that seals every crack and crevice. Comes in convenient 50-pound sacks—easy to place in special cartridge-shaped Eagle Wire Containers sized to fit all casings. Order through your jobber today.

These 3 Eagle Bearing Metals meet most requirements

Eagle Dreadnaught—for extreme speed and heavy-duty conditions.

Eagle Outlasta—for medium speed and average-load conditions.

Eagle Durable—for low speed and light-duty conditions.

EAGLE LEAD WOOL

Seals off Bottom Water—keeps 'em flowing!

THE EAGLE-PICHER COMPANY

EAGLE Since EP 1843 PICHER

Cincinnati • East St. Louis
Chicago • Dallas • Kansas City

PRODUCTION TOOLS by Baird

THRU YOUR SUPPLY STORE

BALL & SEAT ASSEMBLIES —
"Double Seal" or Single Seal of Stainless - Monel or Bronze

SNUBBER CAGES —
For Bottom Hole Pumps

CLEAN OUT TAP & DIES —
For Sucker Rods
Tubing (All sizes and threads)
Blowout Preventer Studs

SAFETY TOOLS —
Safety Wheel Wrench for Rods
Safety Step for Climbing
Polish Rods

TAPERED FISHING TAP —
For Fishing Bottom Hole Pumps

STUFFING BOXES —
(4 Styles)
With Chevron (V-Pac) Rings

●

WRIST PINS
With Tapered Slips — Wrist Pin Puller — Crank Hole Reboring Machine for Field Use

POSITIVE LIFT VALVES —
For Breaking Gas Locks

ROD SOCKETS —
Bulldog Type 2" to 3" Inc.

"ON & OFF COUPLER"—
For Running Oversize Pumps

VALVE SEAT PULLER

POLISH ROD LUBRICATOR —
Using Shredded Graphite for Lubrication

TESTING MACHINES —
For Ball & Seat Assemblies — Air Bubble Principle

TUBING PARACHUTE —
To Prevent Tubing Stretch — Also in Case Tubing is Dropped

BAIRD MFG. CO.—TULSA

Southern Pine Lumber Co., located 330 ft. from north line of lease and 800 ft. southwest of its Woodbine discovery. The same operator's second test was abandoned after drilling the Woodbine from 5,240-5,525 ft.

W. W. Wise 1 Joe B. Copeland, Woodbine wildcat 10 miles east of Rusk in Cherokee County has been given up after taking some 50 ft. of cores in the top of the formation and recovering only slight stains. It penetrated 160 ft. of the Woodbine in drilling to 4,467 ft.

Humble 1 Sackett, deep wildcat south of Flint in Smith County, was preparing to test perforations from 9,623-36 and 9,582-9,602 ft. The section to be tested is just below the Massive anhydrite and above zones previously tested. That section was cored but not drill-stem tested, while drilling, and was said to have shown a good gas kick.

EAST TEXAS (DISTRICTS 5 & 6) WILDCAT FAILURE

Lamar County: Denver Daugherty 1 A. L. Williams, Alfred Moore Sur., 9 mi. NE Paris, dry, TD 2,645 ft. in sandy lime.

CALIFORNIA

Offshore Island Will Be Tested

LOS ANGELES.—Signal Oil & Gas Co. has spudded in an extremely interesting wildcat venture on Santa Rosa Island, about 25 miles off the coast of Santa Barbara. Name and exact location of the well, a joint venture with Honolulu Oil Corp. and the Macoil Corp., have not yet been announced. It is understood, however, that the new location will be at some distance and across a fault from a dry hole drilled on the island several years ago. Prior to staking the location, Signal conducted an extensive geological prospecting survey.

The entire island is under lease by the Signal-Honolulu-Macoil combination, and it is believed that many exploratory wells will be drilled there in the near future. Inasmuch as the terrain is extraordinarily rough and no facilities for oil field operations were present, it has been necessary for Signal to build camp facilities on the island. The very rugged shore line of the island has also made the transporting and landing of drilling equipment a very hazardous undertaking.

First evidence of oil operators carrying the Cuyama Valley play northward through a trend of sedimentary basins roughly paralleling the trend of fields in the San Joaquin Valley was seen last week in the announcement that Signal Petroleum Co. and Lyle A. Garner have drawn up plans for an exploratory campaign in San Benito County. These operators currently are making preparations to drill the first of three exploratory holes on a 21,400-acre block of leases approximately 5 miles northeast of the town of Bitterwater and directly east of the San Andreas fault. The first well will seek production in the Miocene or Cretaceous, with the Miocene expected at a depth of 2,000 ft.

Basin Oil Co. has announced completion of its eighth producer in the Inglewood field of Los Angeles County, the 4-1 Inglewood Comm. The well came in flowing at the rate of 100 bbl. of oil and 2,000,000 cu. ft. of gas daily through a 15/64-in. choke. Total depth was 10,806 ft. Completion of this well now brings the total proven acreage of the field to about 200 acres. The Basin Co. has steadily pushed the limits of the field out since its discovery 2 years ago. It is estimated that ultimate production will be something on the order of 25,000 bbl. per acre, which means that the field has an estimated total ultimate production of about 5,000,000 bbl.

CALIFORNIA SUCCESSFUL WILDCAT

Kern County, Wheeler Ridge area: Richfield Oil Corp. 51-29 Coal Canyon-KCL,

BAR-BE-KETTLE
a Man's Gift

In use by many prominent OIL MEN
(names furnished upon request)

IMAGINE—COOKING WITHOUT ANY FLAME

The "Bar-Be-Kettle" Brings You A Time-Tested Cooking Method In Modern Form.

Two Thousand years ago the Chinese roasted their meats by HEAT AND SMOKE ALONE—by placing a lid over their ovens.

The "Bar-Be-Kettle", by means of its lid, uses the same fundamental approach. Heat from charcoal, plus heat from the heavy cast-iron kettle, plus the smoke—all combined give you that perfect barbecue flavor.

Meat is never burned by flames.

"Bar-Be-Kettle" has five parts—kettle, lid, damper and two grills, one for the charcoal in the bottom of the kettle and the other the meat grill.

USE BAR-BE-KETTLE IN YOUR FIREPLACE DURING THE WINTER-TIME.

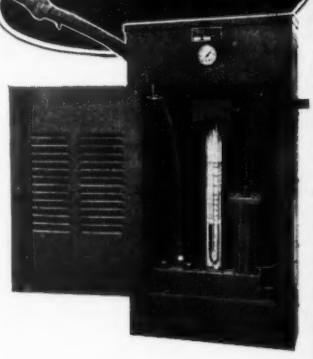
20" diam., 13" high, weight 90#.

$34.75, less 10% in quantities of four or more, delivered PREPAID parcel post in United States.

W. B. MILLISON COMPANY
Colorado Springs, Colo.

Paddock CHLORINATORS

CAPACITIES UP TO 2000 LBS. PER 24 HRS.



FOR ALGAE AND SLIME CONTROL

Operates on high vacuum — no moving parts. Only 6 ft. installation space. Sturdy cabinet permits outdoor installations. Available in 8 capacities — 15 lbs. to 2000 lbs. of chlorine per 24 hours. Ideal for chlorinating drinking water.

Paddock Sales of Texas
Sales Agent for Paddock Engineering Company of Texas
3727 Atwell St., Dallas 9, Texas • M & M Bldg., Houston 2, Texas

29-11n-20w, pumped 16 bbl. in 12 hr., gravity 18.9°, water cut 14 per cent, elev. 1,539 ft., TD 1,210 ft.

CALIFORNIA WILDCAT FAILURES

Fresno County, Coalinga area: Sharples Corp. 73 Domingene, 35-18s-15e, dry, elev. 647 ft., Moreno 8,580 ft., Kreyenhagen 6,100 ft., TD 8,600 ft.

Kern County, Commanche Point area: T. and E. Drlg. Co. 1 T. C. L., 24-11n-18w, dry in granite, elev. unknown, TD 248 ft.

McDonald Anticline area: Woodward and Reynolds 13 Theta, 12-28s-19e, dry, elev. 1,040 ft., TD 1,711 ft.

Independent Exploration Co. 44-17 Layman Two, 17-28s-20e, dry, elev. 937 ft., TD 6,332 ft.

McKittrick area: Pacific Western Oil Corp. 21 Lucas, 29-30s-22e, dry, elev. 1,235 ft., TD 660 ft.

Kings County, Alpaugh area: Standard of California 1 Hughes, 30-23s-22e, dry, elev. 196 ft., 1st Mya 2,755 ft., Cutter sand 3,522 ft., Atwell Island sand 3,637 ft., TD 3,740 ft.

Santa Barbara County, Cuyama Valley area: Producers Oil Corp. of America 34-18 Hinsdale, 18-10n-27w, dry, elev. 2,491 ft., TD 3,357 ft.

WASHINGTON WILDCAT FAILURE
(Previous Completion)

Jefferson County, Hoh River area: Union Oil Co. 1 Milwaukee Land Co., 27-26n-13w, dry, TD 5,600 ft.

PERMIAN BASIN

Production From Strawn Extends Jameson Field

MIDLAND.—The first Strawn sand production of any consequence in northwestern Coke County was reported at Al G. Hill 2 Ralph H. Harris estate, which early this week made a natural flowing potential of 358 bbl. of 48.4°-gravity oil in 24 hours through 12/64-in. choke, from pay at 5,808-48 ft. Gas-oil ratio was 1,272 cu. ft. and flowing pressures were 340 psi. on tubing and 805 psi. on casing.

Location of the 2 Harris is 1,700 ft. from the northwest and 1,100 ft. from southwest lines of Section 532, V. Homann Survey. This places it about 4½ miles due south of Sun Oil Co.'s Jameson discovery, which produces from the reef limestone of the Strawn section. It is not the first Strawn sand production in the area, and possibly the greatest importance is in its 1-mile southeast extension of Pennsylvanian production to the Jameson field. The 2 Harris is ¼ mile east of Hill's 1 Harris, which completed on the pump for 30 bbl. a day from the Strawn sand at 5,808-38 ft.

The Shafter Lake Wolfcamp area of Andrews County was given two prospective extension wells during the week. Stanolind Oil & Gas Co. 1-BG University, Section 21, Block 14, University Lands, ran a 6½-hour drill-stem test at 8,600-45 ft., which brought gas to the top in 5 minutes and oil in 1 hour and 50 minutes. It was allowed to flow into pits for 10 minutes; then gaged 13.8 bbl. of oil the first hour, 11.4 bbl. the second, and 7.5 bbl. the third hour. Top of pay was tentatively placed at 8,620 ft. Successful completion will extend the proven area ¾ mile northeast of Cities Service Oil Co. 1-Y University, which in turn extended Wolfcamp and Devonian pay north of the field's limits.

Completion report on Cities Service 1-Y University, 1,983 ft. from north and east lines, Section 13, Block 13, which was carried on some reports as a wildcat, placed top of the Wolfcamp pay at 8,519 ft., from which it flowed 2,115 bbl. of oil a day on ¾-in. choke. Gravity was 42.8°, and gas-oil ratio 724 cu. ft. Devonian pay was topped at 9,663 ft. and daily potential through ¾-in. choke was 1,833 bbl. of 38°-gravity oil. Gas-oil ratio was 394 cu. ft. On an elevation of 3,276 ft., formation tops were: Wolfcamp 8,450 ft., and Devonian 9,590 ft. Total depth was 9,950 ft.

Seventeen miles northwest of Sterling City, Ray Albaugh & Progress Petroleum 1 Parramore had shows of oil and gas in two tests of the top of the Ellenburger. A 1-hour test from 9,110-51 ft. recovered 165 ft. of slightly gas-cut drilling mud. Drilled to 9,166 ft., another test from 9,125-66 ft. produced a blow of air for 8 minutes, having strong gas odor, and recovered 180 ft. of gas-cut mud. Tentative top on the Ellenburger was 9,120-26 ft., on an elevation of 2,604 ft.

In Hockley County, Woodley Petroleum Co. 1 J. J. Alderson, Glorietta discovery 3 miles northeast of the town of Smyer, and 2 miles east of West Smyer field, completed on the pump for 157 bbl. of 26°-gravity oil, plus some water, from pay at 4,825-5,975 ft., total depth. Gas-oil ratio was 100 cu. ft.

WEST TEXAS (DISTRICTS 8 & 7-C) WILDCAT FAILURES

Andrews County: Superior Oil Co. 2 University 9-D, Sec. 2, Blk. 9, University Lands Sur., 8 mi. S and 4 mi. W Andrews, dry, TD 5,920 ft., no tops reported.

Mitchell County: Skelly Oil Co. 1 M. L. Moore, Sec. 40, Blk. 28, T&P Sur., 7½ mi. S Westbrook field, dry, TD 4,905 ft., San Andres 1,420 ft., Glorietta 2,130 ft., Clear Fork 2,370 ft., elev. 2,198 ft.

Pecos County: Paul L. Davis 1 Humble-Yeager, Sec. 16, Blk. 10, H&GN Sur., 10 mi. SW Imperial, dry, TD 1,588 ft., show of oil 1,430-80 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—Magnolia Petroleum 1 Turney, 23-14s-22e, pre-Cambrian test in Chaves County, was drilling below 4,190 ft. It is reported to be in the Abo section but no

(Continued on page 162)

NOW 3 FINE

Jimmie Gray COMPOUNDS

Jimmie Gray
EXCLUSIVE 500 TON SPECIAL

Jimmie Gray
KANT-GALL TOOL JOINT COMPOUND

Jimmie Gray
LONG-LIFE DRILL COLLAR COMPOUND

Now—you have three choices in Jimmie Gray Compounds . . . each compound engineered to do certain jobs best! And both new compounds have the same dependable quality . . . the same famous money-back guarantee as the widely used Jimmie Gray 500 TON Special!

1.—EXCLUSIVE 500 TON SPECIAL—Today's most widely used tool joint compound, for proper lubrication and protection of tool joint threads. Prevents washouts and galling. Makes breaking out easier; withstands highest pressures; and is unaffected by heat and moisture.

2.—KANT-GALL TOOL JOINT COMPOUND—60% fine mesh metallic zinc and base stocks of the finest quality lubricants. Contains no filler! Especially recommended for getting the maximum efficiency and long-life from NEW tool joints.

3.—LONG-LIFE DRILL COLLAR COMPOUND—Prepared especially for use on drill collars, this compound contains a very high percentage of finely divided metallic lead. Contains no filler! Will not gall or seize; is not affected by contraction, expansion, vibrations or temperature changes.

Write us for further details.

STANDARD OIL SALES CO.

BOX 203 HOUSTON, TEXAS CHARTER 4-5648

SOLD BY SUPPLY STORES EVERYWHERE!

OHIO, KENTUCKY

Morgan County Gets Small Gas Discovery

COLUMBUS.—The Wittmer Co.'s 1 Ivan Morris, Section 13, Bristol Township, Morgan County, found the Clinton very thin and dry at 4,853-59 ft., and the Medina sand dry at 4,956-64 ft. The well was plugged back to 4,840 ft. and the Clinton stray tubed at 500,000 cu. ft. of gas natural with 1,150 psi. The operators have plans for another test, this time probably south of the discovery well.

Two wildcats have been started south of Dover-New Philadelphia. The East Ohio Gas 1 O. & D. Specht, Section 10, Dover Township, Tuscarawas County, is drilling past 1,000 ft., and the Benedum-Trees 1 Rufenacht, Section 13, Goshen Township, has passed the 4,000 ft. mark.

In the Bladensburg pool, the Preston Oil 2 Ray Earlywine, Section 7, Jackson Township, Knox County, had a nice oil showing in the Clinton at 2,928-62 ft. After shot, 100 bbl. was swabbed in the first 24 hours.

Dragon cups will pump your wells longer — will save pulling jobs.

•

GET THEM AT YOUR SUPPLY STORE

DRAGON MFG. CO.
Marietta, Ohio

OHIO WILDCAT FAILURES

Perry County, Bearfield Township: Clay Hicks et al 3 L. G. Sims, Sec. 23, St. Petersburg 6,058 ft., water 6,090 ft., TD 6,090 ft.

Stark County, Nimishillen Township: Wm. Pfeiffer et al 1 John Snyder, Sec. 18, Clinton 4,658-4,723 ft., TD 4,825 ft.

Tuscarawas County, Lawrence Township: Ohio Fuel Gas 1 C. R. Putman, Lot 25, Clinton 4,371-4,472 ft., TD 4,489 ft.

EASTERN KENTUCKY

ASHLAND.—In south central Kentucky, Clinton County, 3-B-54, Bradley et al 1 Brown, a wildcat in the old Beech Bottom area, had top of Knox dolomite at 1,750 ft. and was drilling ahead at 1,950 ft. with only a small show of oil. Test will drill ahead until either commercial oil or gas or some water is encountered. The old Beech Bottom pool of southern Kentucky produced some commercial oil a long number of years ago. This test is latest to revive production in this region.

In Fleming County, 14-V-71, Ed Lillie et al of Cincinnati, Ohio, ran 6¼-in. casing to 1,515 ft. in order to shut off water zone encountered at 1,507-14 ft. Drilling is now progressing at 1,575 ft. with the objective Knox dolomite expected momentarily.

Another big gas well has been drilled in on Dave Compton 1 Rowe, 6-N-78, Magoffin County. Gas gaged better than 20,000,000 cu. ft. from the Big Six sand (Silurian) and is the fourth well in the area. This new pool was discovered by Compton last June.

EASTERN KENTUCKY WILDCAT FAILURE

Powell County: J. C. Kindred 1 C. C. Abner, 12-P-68, dry, TD 2,782 ft., Corniferous 318 ft., St. Peter 2,098 ft., Knox 2,126 ft., water.

WESTERN KENTUCKY

OWENSBORO.—In the northwest part of Union County, Pure Oil Co. and H. C. Farmer 1 A. B. Priest, C N½ SW NW 18-O-18, has a McClosky show. Operator has set casing through the McClosky at 2,674 ft. after a drill-stem test at 2,752-74 ft. had gas in 30 minutes and recovered 240 ft. of mud-cut oil and 60 ft. of oil-cut mud. The well is about 2 miles northwest of Spring Grove.

In McLean County, W. E. Hupp and Joe Bander 1 Arthur Bunch, SW SE SW 6-N-2E, is drilling deeper with cable tools after the Cypress at 2,007-10 ft. failed to produce as much oil as was indicated on early tests.

Sun Oil Co. has completed another South Morganfield pool well at 8 Anderson, 23-O-19, Union County, with an initial production of 72 bbl. from the Waltersburg at 1,781-91 ft.

WESTERN KENTUCKY SUCCESSFUL WILDCAT

McLean County: Ashland Oil & Refining Co. and Basin Drilling Co. 1 F. M. Sandefur, SW NE NW 7-N-26, IP 82 bbl., Aux Vases 2,281-87 ft., and lower O'Hara 2,311-18 ft., TD 2,319 ft. (Discovery well for Beech Grove pool).

WESTERN KENTUCKY WILDCAT FAILURE

McLean County: Maggard & Frain 1 J. L. Ford, SE NW SW 22-N-2E, dry, TD 2,000 ft.

INDIANA

EVANSVILLE.—A new pool seems certain for the southern part of Posey County in the area between the Wabash and Ohio rivers with indicated production at V. R. Gallagher, D. E. Schock, and Aurora Gasoline Co. 1 John Spencer and Aletha Vogel, SW NW SW 12-8s-14w. Operator has set casing at 2,845 ft. for a test of the McClosky after a drill-stem test at 2,850-75 ft. had gas in 3 minutes and flowed natural clean oil in 19 minutes at the rate of 30 bbl. per hour. Bottom-hole pressure was 1,200 lb. Total depth is 2,971 ft. The well is located about 7 miles southwest of Mount Vernon, Ind., and about 3 miles north of Uniontown pool in Kentucky.

The Vigo County discovery, C. B. Mansfield 1 Sutliff, NW NW NW 14-11n-9w, is

(Continued on page 162)

STROM BALLS *Worked on the "BIG INCH"*

When the job is tough, and operation is vital, Strom Balls play an important part in pipeline construction and operation. Strom Balls reduce friction in ditching machines, shovels, cranes, tractors, gas engine compressors and pumping stations. As an aid in reducing mechanical friction in the Petroleum Field, depend on Strom Balls. Write for catalog. Strom Steel Ball Co., 1850 South 54th Avenue, Cicero 50, Ill. Pacific Coast Representative: Precision Bearings, Inc., 1706 South Grand Avenue, Los Angeles 15, California.

Strom BALLS Serve Industry

Largest Independent and Exclusive Metal Ball Manufacturer

MEN!

ARE YOU PRESSED FOR TIME?

KRAFTBILT oil record forms will save you time and money. Shipped immediately from stock in any quantity.

ASK FOR CATALOG TODAY

Kraftbilt ROSS-MARTIN CO.
423 E. 4th St. TULSA, OKLA

September Total Completions Hit New High for Year

by Polly De Armond

A NEW monthly completion record for the year was established in September when operators reported that 3,777 new wells were finished during the month. The total figure is made up of 2,429 oil and gas producers and 1,348 dry holes which include storage, input and disposal wells. Footage drilled reached 13,077,396 ft., only slightly more than 29,000 ft. under this year's footage record set in July. The number of active rigs gained 134 over the previous month's record to reach a new high of 4,935.

September vs. September

All sections of the nation reported gains in completions over September of last year, with a negligible decline in footage occurring in only one area. The total number of wells increased 33 per cent and footage was up 28 per cent. The greatest gain was recorded in the group of Southern states which was up 75.9 per cent in wells and 45.6 per cent in footage. Texas and New Mexico rose 68.7 per cent in completions and 67.8 per cent in footage drilled, while the Mid-Continent division was up 27 per cent in wells and 44 per cent in footage.

The Pacific Coast showed 18.6 per cent more wells, but footage dropped 3.7 per cent from last September. Completions in the North Central section and Rocky Mountain region increased 8 per cent and 5 per cent respectively, with proportionate gains in footage drilled for both areas, and the Eastern district rose slightly in both categories.

Cumulative Comparisons

Completions for the first 9 months of 1948 compared with the same period of 1947 increased 4,644 wells or 19.2 per cent, and footage was up 15,674,000 ft. or 18.7 per cent. The western areas paced these gains for the cumulative periods, with the Rocky Mountain region up 40.7 per cent in completions and 52.5 per cent in footage, and the Pacific Coast up 41.8 per cent in wells and 20.1 per cent in footage.

The Southern states of Arkansas, Louisiana, Mississippi, Alabama, Georgia, Florida, and Tennessee reported a gain of 31.8 per cent in completed wells and 10.6 per cent in footage. The Texas-New Mexico area increased 27.5 per cent in wells and 24.4 per cent in total footage drilled from January through September.

In the North Central district (Ohio, Indiana, Kentucky, Illinois, and Michigan) completions rose 17.4 per cent and footage was up 12.7 per cent, and the Mid-Continent division, represented by Oklahoma, Kansas, Nebraska, Missouri and Iowa, showed a 14.9 per cent gain in wells with a 23.7 per cent footage gain over the first three quarters of last year. The Eastern area noted the only decreases for the period, with a 5 per cent drop in both wells and footage.

SUMMARY OF COMPLETIONS, SEPTEMBER 1948

	Total comp.	Oil	Initial prod.	Gas	Dry	Under 2,500 ft.	2,500-5,000 ft.	5,000-7,500 ft.	7,500-10,000 ft.	Over 10,000 ft.	Total footage	Rigs and drilling
New York	119	60	126	0	59	119	0	0	0	0	172,305	150
Pennsylvania	314	159	349	25	130	287	27	0	0	0	494,610	271
West Virginia	92	20	276	54	18	48	41	3	0	0	244,734	170
Ohio	103	29	464	24	50	49	54	0	0	0	262,144	192
Indiana	95	48	5,970	1	46	76	19	0	0	0	182,528	120
Kentucky	76	22	938	15	39	68	8	0	0	0	151,087	68
Illinois	215	103	12,065	2	110	74	141	0	0	0	549,581	260
Michigan	88	35	5,855	3	50	57	31	0	0	0	191,024	150
Kansas	294	138	51,479	40	116	26	262	6	0	0	956,199	413
Neb., Mo., Iowa	2	0	0	0	2	1	1	0	0	0	5,250	11
Oklahoma	376	209	28,198	24	143	105	185	71	8	7	1,396,823	679
Texas	1,285	816	130,144	54	415	300	574	260	117	34	5,581,224	1,271
North	224	111	11,986	1	112	101	95	28	0	0	669,972	187
West Central	166	80	10,898	6	80	37	121	8	0	0	530,358	135
West	356	302	78,157	5	49	64	164	62	51	15	1,763,424	239
Panhandle	67	49	3,374	14	4	4	63	0	0	0	205,875	165
Eastern	67	33	4,558	10	24	5	33	23	6	0	341,219	129
Gulf Coast	193	101	12,799	15	77	8	51	80	38	16	1,215,650	250
Southwest	212	140	8,372	3	69	81	47	59	22	3	854,726	166
Louisiana	271	188	17,639	20	63	169	22	22	33	25	1,064,796	252
Northern	202	146	7,827	18	38	169	14	13	4	2	450,947	79
Southern	69	42	9,812	2	25	0	8	9	29	23	613,849	173
Arkansas	36	23	1,628	1	12	6	21	4	5	0	148,086	38
Mississippi	46	26	4,214	3	17	0	7	20	11	8	320,382	51
Ala., Ga., Fla.	5	1	136	0	4	1	2	1	0	1	25,524	9
Montana	24	15	1,558	1	8	15	9	0	0	0	55,356	66
Wyoming	44	29	10,599	0	15	2	26	12	2	2	210,243	213
Colorado-Utah	12	4	543	2	6	2	4	5	1	0	57,714	73
New Mexico	55	39	5,793	5	11	9	29	13	3	1	237,219	124
California	217	186	32,386	2	29	73	82	22	35	5	759,719	344
Miscellaneous (Tenn.)	8	3	57	0	5	7	0	1	0	0	10,848	10
Total September 1948	3,777	†2,153	310,417	276	*1,348	1,494	1,545	440	215	83	13,077,396	‡4,935
Total August 1948	3,486	1,959	309,981	244	1,283	1,361	1,405	436	199	85	11,902,953	4,801
Total September 1947	2,833	1,527	240,937	288	1,018	1,267	1,076	430		60	9,414,053	4,486
Cumulative 9 months 1948	28,867	16,504	2,421,786	2,082	10,281	11,288	11,813	3,359	1,578	696	99,496,059	.....
Cumulative 9 months 1947	24,223	13,254	2,372,232	2,419	8,550	10,349	9,175	4,102		597	83,822,057	.....

*Incl. 216 service wells: N. Y. 59, Pa. 121, Ohio 7, Ill. 1, Mich. 13, Kans. 6, Okla. 2, No. Tex. 2, W. Cent. Tex. 1, S.W. Tex. 3, No. La. 1. †Incl. 25 distillate wells: Okla. 1, W. Tex. 1, E. Tex. 1, Tex. Gulf 8, S.W. Tex. 3, No. La. 2, So. La. 4, Ark. 1, Miss. 4. ‡Incl. all wells rigged up and/or drilling at end of month.

STATISTICS and

WEEKLY WELL COMPLETIONS . . . WEEK ENDED OCTOBER 23, 1948

	Total of all wells							Wildcat completions and discoveries									
						Cum.							Cumulative total, 1948				
	Comp.	Oil	Gas	Dry	Footage	1948	1947	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	26	13	0	*13	28,907	1,239	1,392	0	0	0	0	0	0	0	0	0	0
Pennsylvania	49	24	4	†21	76,698	2,108	2,483	0	0	0	0	0	0	0	9	14	23
West Virginia	12	2	8	2	27,665	668	702	0	0	1	0	1	3	0	36	39	78
Ohio	38	12	9	‡17	107,013	1,145	1,090	0	0	0	3	3	2	0	10	31	43
Indiana	33	22	0	11	59,618	882	534	1	0	0	4	5	22	0	1	59	82
Kentucky	18	4	6	8	39,005	627	577	1	0	0	2	3	8	0	0	34	42
Illinois	61	26	0	35	160,198	2,008	1,695	2	0	0	12	14	40	0	1	313	354
Michigan	24	6	2	16	57,373	692	736	0	0	0	11	11	14	0	9	214	237
Kansas	66	35	8	§23	207,637	2,535	2,161	1	0	0	13	14	48	0	6	354	408
Neb., Mo., Iowa	1	0	0	1	1,828	8	5	0	0	0	1	1	0	0	0	7	7
Oklahoma	92	39	16	¶37	277,620	3,396	3,347	3	0	0	14	17	105	7	26	522	660
Texas	246	156	6	84	1,010,514	9,690	7,447	6	1	2	36	45	284	29	86	1,670	2,069
North Central (Dist. 7-B & 9)	79	40	6	§39	232,505	3,026	2,370	3	0	0	15	18	104	0	13	615	732
West (Dist. 7-C & 8)	60	56	0	4	285,303	2,622	1,809	0	0	0	3	3	58	1	5	191	255
Panhandle (Dist. 10)	7	6	1	0	21,416	517	377	0	0	0	0	0	0	0	3	8	11
Eastern (Dist. 5 & 6)	13	8	0	§5	62,558	470	440	0	0	0	1	1	11	3	0	96	110
Gulf Coast (Dist. 2 & 3)	42	21	5	16	250,597	1,516	1,281	1	0	2	6	9	65	20	30	352	467
Southwest (Dist. 1 & 4)	45	25	0	20	158,135	1,539	1,170	2	1	0	11	14	46	5	35	408	494
Louisiana	55	28	5	22	259,957	1,916	1,249	0	0	1	8	9	41	22	7	178	248
Northern	35	20	4	11	102,907	1,303	732	0	0	0	6	6	4	3	2	90	99
Southern	20	8	1	11	157,050	613	517	0	0	1	2	3	37	19	5	88	149
Arkansas	7	5	2	0	28,360	251	248	0	0	0	0	0	5	0	0	74	79
Mississippi	13	6	1	6	95,442	340	397	0	0	0	5	5	4	1	3	79	87
Southeastern States	1	0	0	1	6,018	44	53	0	0	0	1	1	0	0	0	40	40
Montana	5	2	0	3	13,555	231	240	0	0	0	2	2	3	0	0	18	21
Wyoming	13	11	0	2	57,341	443	205	1	0	0	0	1	22	0	2	53	77
Colorado-Utah	4	2	0	2	26,714	189	165	0	0	0	2	2	2	0	5	40	47
New Mexico	12	8	0	4	47,837	488	435	0	0	0	3	3	4	1	2	42	49
California‖	44	33	0	‖11	158,818	2,318	1,621	1	0	0	‖8	9	102	1	5	267	375
Total United States	820	434	67	319	2,748,118	31,218	26,782	16	1	4	125	146	709	61	208	4,048	5,026
Total previous week	855	493	82	280	3,092,060	30,398	26,043	19	2	7	111	139	693	60	204	3,923	4,880
Total October 25, 1947	739	396	83	260	2,442,864			12	2	4	103	121	572	79	179	3,298	4,128

Service wells included: *13, †21, ‡3, §1, ¶2. ‖Incl. 1 Washington.

CRUDE PRICES AND REFINERY ACTIVITY

GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Okla-homa, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$2.17	....	....	....
19-19.9	2.19	....	....	....
20-20.9	2.21	$2.25	....	$2.12
21-21.9	2.23	2.27	....	2.14
22-22.9	2.27	2.29	....	2.16
23-23.9	2.30	2.31	....	2.18
24-24.9	2.34	2.33	$2.56	2.20
25-25.9	2.38	2.35	2.58	2.22
26-26.9	2.41	2.37	2.60	2.24
27-27.9	2.45	2.39	2.62	2.26
28-28.9	2.49	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.56	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.62	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point. †Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947. (For detailed price changes in all fields see The Oil and Gas Journal, January 1, 1948, page 107.)

A.P.I. REFINERY REPORT, WEEK ENDED OCTOBER 16

	(Thousands of barrels)					Stocks at refineries, bulk terminals, in transit and in pipe lines			
	Crude runs, daily	Production							
District—	avg.	Gasoline†	Kerosine	Gas & dist. oil	Residual	Gasoline*	Kerosine	Gas & dist. oil	Residual
East Coast	871	2,391	319	1,410	1,676	21,980	11,398	25,633	12,547
Appalachian:									
District 1	99	294	58	97	101	2,229	442	893	460
District 2	64	211	19	44	76	1,059	133	265	191
Ind., Ill., Ky.	956	3,431	407	918	1,117	18,690	4,879	12,147	6,493
Okla., Kans., Mo.	432	1,567	172	640	511	8,241	1,565	6,337	2,778
Inland Texas	246	1,040	102	181	425	3,300	812	1,203	1,189
Texas Gulf Coast	1,409	4,350	769	2,419	1,743	15,261	3,507	12,866	10,107
La. Gulf Coast	432	1,327	285	736	510	5,203	2,645	4,083	3,459
N. La. and Ark.	79	221	56	85	126	2,123	510	649	311
Rocky Mountain:									
New Mexico	13	51	7	13	27	67	25	56	31
Other Rocky Mtn.	139	453	33	185	206	1,743	306	1,481	927
California	822	2,088	62	800	2,673	11,587	770	13,034	40,918
October 16, 1948	5,562	17,424	2,289	7,528	9,191	91,483	26,992	78,647	79,411
October 9, 1948	5,551	17,045	2,415	7,234	8,798	91,411	27,061	77,879	78,166
October 18, 1947	5,167	16,298	2,176	6,217	8,542	80,912	22,516	61,312	57,776

*Finished and unfinished. †At refineries including natural blended.

Bureau of Mines crude-oil stocks 227,751,000 bbl. as of October 16—up 1,549,000 bbl. One year ago 222,430,000 bbl.

FLAT CRUDE PRICES

Representative posted schedules per bbl.

East Texas	$2.65
Kettleman Hills, California*	2.14
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.55
Bradford, Pennsylvania	3.00
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.93

*37°-37.9°. †35° and above.

TRENDS

DAILY AVERAGE PRODUCTION FOR WEEK

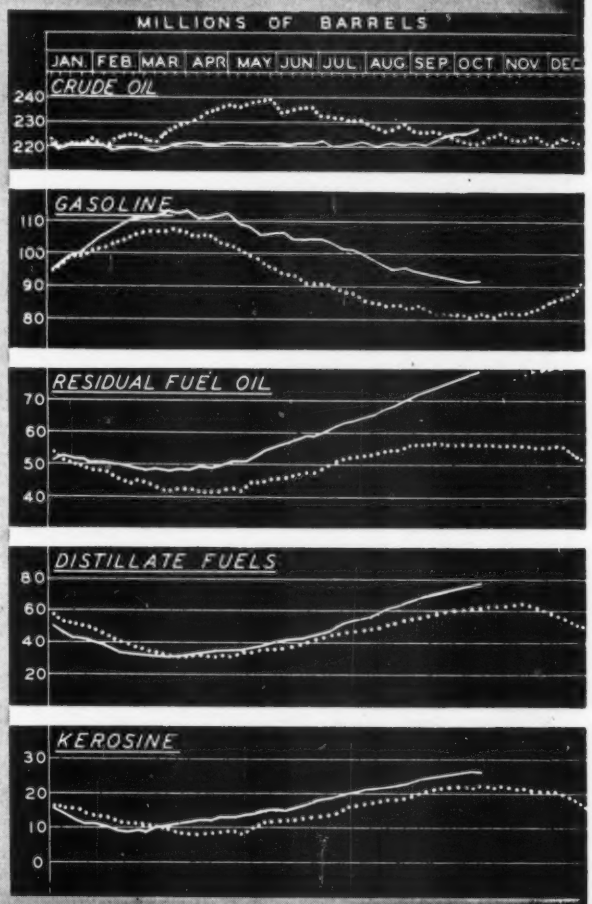
	Oct. 23 crude oil	B. of M. Oct. demand	Oct. 16 crude oil
Alabama	1,450	1,200	1,400
Arkansas	81,200	89,000	82,050
California	949,000	965,000	937,500
Colorado	47,990	50,000	47,450
Eastern	67,250	65,300	67,800
Florida	975	800	825
Illinois	178,000	168,000	180,600
Indiana	26,000	17,000	24,500
Kansas	306,950	306,000	302,550
Kentucky	24,000	24,000	23,900
Louisiana	481,250	502,000	481,950
North Louisiana	112,950	.....	113,650
South Louisiana	368,300	.....	368,300
Michigan	45,500	45,000	47,950
Mississippi	126,350	131,000	126,400
Montana	26,010	26,000	26,310
Nebraska	350	700	350
New Mexico	133,310	138,000	133,310
Oklahoma	434,450	438,000	432,250
Texas	2,507,000	2,500,000	2,507,000
Dist. 1 (Southwest)	28,485	.....	28,485
Dist. 2 (Southwest)	179,675	.....	179,675
Dist. 4 (Southwest)	254,300	.....	254,300
Dist. 3 (Gulf Coast)	504,565	.....	504,565
Dist. 5 (Eastern)	51,250	.....	51,250
Dist. 6 (Eastern)	121,800	.....	121,800
East Texas Field	301,500	.....	301,500
Dist. 7-C (West)	47,875	.....	47,875
Dist. 8 (West)	728,975	.....	728,975
Dist. 7-B (W. Central)	57,675	.....	57,675
Dist. 9 (N. Central)	142,400	.....	142,400
Dist. 10 (Panhandle)	88,500	.....	88,500
Wyoming	160,700	153,000	161,610
Total United States	*5,597,735	5,620,000	5,585,705
Change from prev. wk.,	up 12,030		

Total production January 1-October 23 †1,630,536,890 bbl.
Same period last year (crude plus cond.) 1,489,015,395 bbl.

*Not incl. 76,965 bbl. condensate. †Incl. 22,006,405 bbl. condensate.

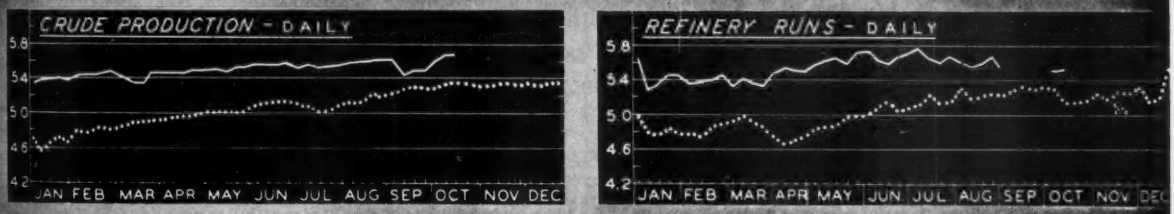
STOCKS IN UNITED STATES

---- 1947 ——— 1948



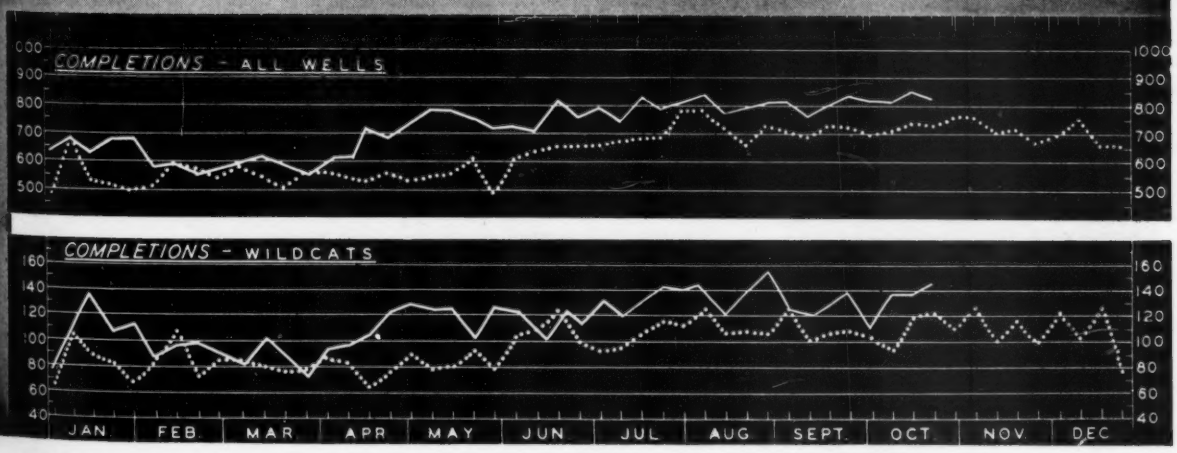
DAILY OPERATIONS

---- 1947 ——— 1948

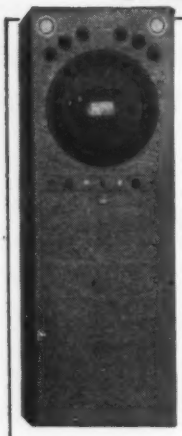


WEEKLY COMPLETIONS

---- 1947 ——— 1948



Beautiful
INSTRUMENT CABINETS!

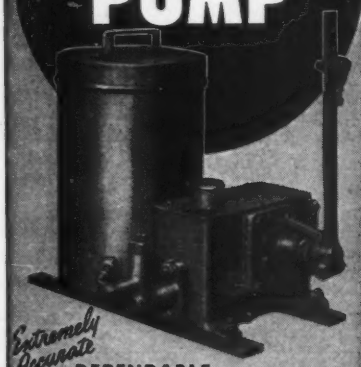


Falstrom Builds Housings, Panels and Cabinets for all High Grade Industrial Components

. . . and Falstrom builds them with the same careful workmanship and attention to detail that characterize the products they enclose . . . fine design details, quality heavy construction, precision made internal supports and face cutouts, superb surface finishes. . . . but Bulletin 116 tells all! Write today.

FALSTROM COMPANY
38 Falstrom Court, Passaic, New Jersey
ENGINEERS • DESIGNERS • FABRICATORS SINCE 1870

McCORD
TYPE "C"
CHEMICAL MEASURING
PUMP



Extremely Accurate
DEPENDABLE
Accuracy of delivery in McCord chemical pumps is the result of a finely engineered design with a minimum number of parts. Dependability is insured because working parts are fully enclosed, protected from dirt and the elements. Specify McCord. For sale by National Supply Co.

Standard of the Oil Fields
McCORD
CORPORATION, DETROIT 11, MICH.

MARKETS

THE change in method of pricing gasoline and other light products by The Texas Co. and the apparent dimming of the possibility of a general crude-price increase occupied the center of attention by marketers and observers in most marketing areas last week. The market for petroleum products, meanwhile continued generally slow and unchanged.

The motivating force behind Texaco's action, it was generally agreed by market observers, was that of a "protective measure." They indicated that Texaco might be a "jump ahead" of government intervention or meddling in the price basis for oil-industry products.

The Texas Co., which is the only company operating in all 48 states and the District of Columbia, so far is the first oil company to have made the change. Texaco's action is in line with the recent court decision on the cement case which, in effect, is considered to outlaw basing-point pricing by prohibiting sellers from equalizing freight charges to compete with a source nearer a customer.

Old timers who have been in marketing operations for more than three decades have pointed out that the Group 3 method of pricing has been in effect as long as they can remember and it has always been accepted as a fair method of pricing for both sellers and buyers.

Several industrialists who have changed to an f.o.b. mill basis have been reported to have indicated that they would not think of going back to basing-point prices unless Congress legalized freight absorption.

Mid-Continent

Strength in the spot market of petroleum products in the Mid-Continent area last week was found in the movement and demand for kerosine, prime white, and range oil. Gasoline continued to be in fair demand, particularly in the harvesting areas. Other products were reported as slow. One supplier reported moving his kerosine on the spot market at 9¾ cents "and up."

Movement of No. 2 was particularly dependent upon a general drop in temperatures to strengthen its position marketwise. Offers of No. 2 by suppliers have been reported as low as 8⅝ cents per gallon for immediate delivery only.

Kerosine and No. 1 were being closely held by suppliers. Allocations or promised material for the coming winter are difficult to obtain, one buyer pointed out. No movements of No. 6 were reported, as full or nearly full storage of refiners remained a problem.

Gulf Coast Trading Dull

Little activity was reported in products markets in the Houston area last week. Price of motor fuel on the spot market appeared to be moving fractionally lower; burning oils were firm; and No. 6 residual fuel oil continued extremely weak.

Suppliers were reported asking 10¾ cents for regular-grade gasoline, but little was moving. Two cargoes of No. 2 went at a reported 9 cents and the number of offerings at this price was reported increasing. One large supplier dropped his price for No. 6 fuel oil to $2.36.

New York Harbor

In New York Harbor heating oil inquiries were light. On the spot market No. 2 was reported easily available at between 9.7 and 9.8 cents per gallon. Heavy fuel oil remained "sloppy" while suppliers were reported to be turning down low-priced material because of lack of storage.

Representative Quotations

Representative spot-market quotations of leading suppliers as of October 25, 1948. **Figures are f.o.b. plant for tank-car shipment in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.**

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor	Texas Gulf Coast
Regular gasoline, 73-75 octane	10¼-10½	11.6-12* 10.5-11.9†	10¼-11⅛
Premium gasoline, 78-80 octane	11-11¼	10.6-13.4	11-12⅛
42-44 w.w. kerosine	9½-9¾	10.3-11.7	9½-10¼
No. 2 straw fuel oil	9-9¼	9.4-10.1	9-9⅛
No. 6 residual	$1.90-2.10	$3.03-3.37	$2.20-2.52

*Branded (74-76 octane); †Unbranded (74-76 octane).

NATURAL GASOLINE

	Group 3	North Texas	N. La
Grade 26-70	8½	8	8¼
Grade 18-55	10.2	9.6	9.9

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	12-14.5
750 vis., No. 3-4 neutral	15-17.25
2,000 No. 5-6 neutral	17-21

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	21-23
200 vis. No. 3 neutral, 0-10 pp.	19-21

Western Pennsylvania

145-155 vis. 10 p.t. bright stock	46
180 vis. p.t. neutral	47

CRUDE-SCALE WAX

Mid-Continent

132-134 A.M.P.	5½

HENRY H. PARIS
Manufacturer's Agent - Oil Well
P. O. BOX 932
HOUSTON,

DISTRIBUTOR Inc.
and Refinery Supplies
1125 ROTHWELL ST.
TEXAS

Harrisburg Forged Steel Flanges — Seamless Pipe Couplings

Harrisburg Drop-Forged Steel Pipe Flanges meet every test of strength and safety. Their unvarying uniformity merits your consideration wherever quality is essential. Made to ASA standards.

Harrisburg Forged Seamless Steel Pipe Couplings are uniform in strength and quality. Threads will not strip under most severe strain. Manufactured to API specifications.

Agent and Distributor for the following Nationally known Manufacturers

W. C. NORRIS MANUFACTURER, INC.
Tulsa, Oklahoma
Quality Pumping Equipment, Swage Nipples, Bull Plugs, Welding Fittings, etc.

WHEELING MACHINE PRODUCTS CO.
Wheeling, West Virginia
XL Steel Pipe Couplings for OIL COUNTRY TUBULAR PRODUCTS Gas-Water-Steam.

THE OHIO INJECTOR COMPANY
Wadsworth, Ohio
OIC VALVES, Bronze, Iron and Steel, for all purposes. "Oh! I see Lower Costs with OIC."

HARRISBURG STEEL CORPORATION
Harrisburg, Pennsylvania
Forged Steel Flanges and Seamless Casing Couplings.

VOLCANO BURNER COMPANY
Houston, Texas
Volcano Superior and Gulf States All Steel Gas Burners for OIL COUNTRY BOILERS.

OIL STATES EQUIPMENT COMPANY
Houston, Texas
OSECO Silvertop Fusible Plugs with renewable inserts for all types OIL COUNTRY BOILERS.

DRESSER MANUFACTURING DIV.
Bradford, Pa.
Seamless Welding Fittings.

90 Deg. DRESSER ELLS

Made by an exclusive process from seamless steel pressure tubing, meeting ASTM A-234 standards, Dresser Ells are cold formed to assure optimum physical properties of the metal. Center-to-face dimensions held to one and one-half times the nominal size. Minimum wall not less than thickness of specified pipe. Straight tangent on both ends means, 1) Weld removed from plane of greatest stress, 2) Straight bead welding permitted, 3) Pipe alignment simplified.

ADDS LIFE TO YOUR ENGINES

TUNE-O-LENE

- **Greatly Reduces FRICTION — Penetrates and lubricates where Ordinary Oil Fails.**
- **FREES Sticky Valves.**
- **KEEPS High Compression Engines FREE of gum, sludge and carbon binder.**
- **Helps increase Engine Power.**
- **Reduces fuel consumption.**
- **Prevents corrosion.**

Add regularly to fuel and motor oil

Guaranteed!!

To Reduce Friction and Wear

Or Double Your Money Back

AUTOMOTIVE Hobbsco CHEMICAL PRODUCTS

HOBB SWETNAM CO., INC.
WICHITA FALLS, TEXAS

For Lower MAINTENANCE COST

- BUTE FUME-PROOF HOUSE PAINT
- BUTE HEAT RESISTANT ALUMINUM
- BUTE ZINC CHROMATE PRIMER
- BUTE RED OXIDE PRIMER
- BUTE QUICK DRYING RED LEAD
- BUTE BLACK UTILITY ENAMEL
- BUTE GRAPHITE PAINT
- BUTE SYNTHETIC INDUSTRIAL ENAMEL
- BUTE QUICK DRYING ENAMEL
- BUTE TRAFFIC PAINT

Behind the manufacture of Bute industrial finishes are 81 years of paint making experience. Bute protective coatings are especially designed to serve the needs of your industry. They have proven themselves through years of satisfactory service.

JAMES BUTE COMPANY
P. O. BOX 1779 HOUSTON, TEXAS

EQUIPMENT MEN ... in the News

Gas-Engine Development By Cooper-Bessemer

Adaptation of Cooper-Bessemer's Turboflow development to the four-cycle gas engine will produce 14 per cent more power while cutting fuel costs by at least 20 per cent, according to Gordon Lefebvre, president and general manager. The newest Turboflow is expected to be on the Cooper-Bessemer production line by July 1 of next year, Lefebvre said.

The new Turboflow four-cycle engine will discard the standard fuel-mixing valve and utilize a simple gas-injection system similar to that used on the company's atmospheric gas-diesel engines. Prior to the new Turboflow development, company officials point out, the four-cycle gas engine had been rated at 70 b.m.e.p. and fuel consumption at the rate of 9,500 B.t.u. In addition, exhaust temperatures have been reduced from 1,000° to 850° or about 15 per cent.

Significance of the new development is that in any area where natural gas is available at $1.10 or less for 1,000 cu. ft. (which is the fuel cost equivalent of current 14-cent-per-gallon fuel oil) fuel cost savings can be achieved.

J. H. Batten Elected President Twin Disc

Newly elected president of Twin Disc Clutch Co. is John H. Batten, according to an announcement by the company's board of directors. P. H. Batten, founder of the company, who previously has held the positions of president and chairman of the board, will maintain an active interest in company affairs as chairman of the board of directors.

The new president joined the Twin Disc Clutch Co. in 1935. In 1937 he was appointed a member of the board of directors and has continued to serve on the board since that date. He has also served as assistant general manager and as assistant treasurer.

In 1943 he was appointed vice president and assistant general manager, and in 1945 executive vice president, which position he has held until his recent election as president.

Other officers of the Twin Disc Clutch Co. reelected include: Soren Sorenson, vice president, manufacturing; N. F. Adamson, vice president, sales and engineering; G. L. Shuman, secretary - treasurer; R. T. Rehwald, assistant secretary, and R. T. Howell, assistant secretary.

Mid-Continent Supply Promotes Ratliff

L. T. RATLIFF

Ken W. Davis, president and general manager of Mid-Continent Supply Co., Fort Worth, has announced the promotion of L. T. Ratliff to district manager in Los Angeles. He will handle the company's export and West Coast business. Ratliff, former manager of Mid-Continent's store in Gainesville, Tex., has been with the company since 1942, except for a year and a half in the Army. Before coming with Mid-Continent, he was employed by National Supply Co. and Industrial Supply Co.

Allis-Chalmers Promotes Bilsland

B. F. Bilsland has been promoted from manager of the Allis-Chalmers Chicago district to manager of the company's newly formed Midwest region. Bilsland has been associated with Allis-Chalmers since 1919 and has been manager of the Chicago district for the last 15 years. He will continue to make his headquarters in Chicago. J. C. Collier succeeds Bilsland as Chicago district manager.

Metallic Moves to New Quarters

Metallic Building Co. has moved its office and fabricating shops to a new plant site at 4601 Holmes Road, Houston.

Atlas Chain Names Schmidt

Atlas Chain & Manufacturing Co., Philadelphia, has appointed O. W. Schmidt as Central States district sales manager. Schmidt, formerly sales manager for Shafer Bearing Co. of Downers Grove, Ill., will maintain offices in Chicago.

Tretolite Adds Purdy To Research Staff

George E. Purdy, formerly with General Chemical Co., has joined the staff of Tretolite Co. research laboratory at St. Louis. In his new work, Purdy will be engaged in the investigation of corrosion problems, and in the development and application of Tretolite's new Kontol Corrosion Inhibitors.

Patterson Elected President A. I. S. C.

N. R. Patterson, president of Patterson Steel Co, Tulsa, manufacturer and fabricator of steel products, was elected president of American Institute of Steel Construction, Inc., at recent national convention at Chateau Frontenac, Quebec, Canada.

Director and past president of Central Fabricators Association, Patterson also serves as a director of the National Association of Manufacturers. He was a director and vice president of A.I.S.C. prior to his election to the presidency. Current membership of A.I.S.C. includes more than 220 concerns which normally fabricate and erect more than 85 per cent of the country's annual tonnage for buildings, bridges, and other steel structures.

Eastman Visiting Europe

H. John Eastman, president of Eastman Oil Well Survey Co., is on a trip which will include England, Holland, Belgium, France, Germany, and Luxembourg. Purpose of the trip is to reestablish business associations disrupted by the war, and to get first-hand information on the international petroleum situation in areas where Eastman services and equipment have been extensively used.

(Continued on page 161)

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED

All ads, 12 cents a word. Minimum charge, $3.00 per insertion.
Centered Line, any ad, $1.00.
Box Numbers count 9 words when replies are to be sent to our Tulsa Office. Replies forwarded without charge.

DISPLAYED, PER INCH

$12.00 per column inch per insertion. One-point border and 12-point capitals are allowed. Larger type sizes not accepted.

All classified advertising payable in advance.
10% Discount if 3 insertions are ordered at one time.
COPY DEADLINE, 9:00 a.m. Monday prior to each week's issue.

THE OIL AND GAS JOURNAL
P. O. Box 1260, TULSA, OKLAHOMA

EQUIPMENT FOR SALE

FOR SALE at Pampa, Texas, 30 used Type OB-36 Ideal Throwoffs with covers, figure H-363-D National Supply catalog, $3.00 each. Cities Service Oil Company, Patridge, Bartlesville, Oklahoma.

PIPELINE Construction Equipment for Sale: Pipe cleaning machine with priming head, traveling or stationary, 6" to 12", excellent condition, $1,350. Two T40 International tractors with pipelayer attachments, good condition, very cheap. Contact C. W Sternberg, 8250 Wier Drive, Houston, Texas Phone Preston 7043.

VERY complete cable tool drilling outfit, in Kansas. Includes 4,000 feet casing and many, many other items. Full inventory furnished on request. Price $40,000. Write Box 2153, Denver, Colorado.

FOR SALE: 1946 FAILING 314-C Rotary Drill Rig mounted on 2½ Ton GMC, used very little and in like new condition. Rated capacity 1500'. Fully equipped with Bailing Unit, Automatic Chuck, Swinging Spider, Tools, etc. $10,000. W. D. Thomas, Rock Springs, Wyo.

FOR SALE

1—125 H. P. 350# Working Pressure "Oil Well Boiler," excellent condition. Completely reconditioned. Not used since last approved by State Boiler Inspector. Priced to sell.

POWELL BRISCOE, INC.
1916 First National Bldg.
Oklahoma City, Oklahoma

WE BUY and SELL

Steel Pipe and Tubing
Pipe Fittings—Well Casing
Culverts and Valves

SONKEN-GALAMBA CORP.

2nd & Riverview, Kansas City 18, Kans.

EQUIPMENT FOR SALE

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

FOR SALE: Wilson Master Model Winch powered by 6 MZR Waukesha engine. Unit mounted on one and one-half ton Chevrolet truck equipped with fifty foot single pole telescoping mast. Terms. Melton Supply Company, Seminole, Oklahoma.

37 SULLIVAN CORE DRILL, truck mounted; also 71-speed Star, trailer mounted; water trucks, drill pipe and tools. Interested in 36-L Bucyrus. L. F. Capshaw, 102 West Boeing, Oklahoma City, Oklahoma City, Oklahoma. Phone 72-3955.

FOR SALE: 2,000' of 3½" Internal Upset Drill Pipe, Range 1, Good Tool Joints, $1.00 per foot. Contact P.O. Box 1022, Del Rio, Texas.

FOR SALE: Wilson Super Model Winch powered by 6 MZR Waukesha engine Terms. Melton Supply Company, Seminole, Oklahoma.

USED Le Roi 6-, 8-, and 12-cylinder gas engines, complete and in A-1 condition for oil industry power. Priced to sell. Also one Model NKU Waukesha $1500. Write or call today. General Machine & Supply Company, P. O. Box 72, Wichita Falls, Texas.

MANUFACTURERS LATEST DESIGN

Hydraulic Casing Pulling Units. Complete line of equipment. Units made to your specifications. Truck Mountings or Skid Units. Repair Service and Parts.

OKLAHOMA MACHINE & SUPPLY CO.
Ada, Oklahoma

SHOT HOLE DRILLS
LARGE AND SMALL

All are truck mounted, rotary, chain pull down, smallest pump size 3½ x 5. Some are in excellent condition, others need repairs. Price FOB Dallas from $3,000.00 to $8,000.00 including truck. For details write 8000 Lemmon Ave., Dallas 9, Texas.

EQUIPMENT FOR SALE

GOOD Used Ingersoll-Rand Portable Compressor, single stage 14¼"x4¼"x10" duplex, belt connected through main disc clutch to four cylinder 7½"x8" vertical Western Gas Engine, with starting engine and all accessories. Includes low pressure two stage equipment for conversion to 10"x4¼"x10" X.O.B. Engine and compressor unitized on separate fabricated and welded steel bases. The Sharples Oil Corporation, Box 180, Denver, Colorado.

DRILLING equipment, reconditioned ready for delivery, Failing, Franks, Eli Tulsa, Longyear, American, Sullivan, Fort Worth, Wichita, Keystone, National, Standards. Also steel derricks, cable tools, cable and good used casing, most sizes. Pressey & Son, Pueblo, Colo.

AVAILABLE NOW

REFINING EQUIPMENT

HEAT EXCHANGERS
all types, sizes
•
FRACTIONATING TOWERS
•
STABILIZING TOWERS
•
ABSORPTION TOWERS
•
STILLS—TANKS
•
HOT OIL PUMPS
•
TOPPING and
CRACKING PLANTS
•
PIPE VALVES FITTINGS
•

Largest used refining equipment house on Pacific Coast

Dulien Steel Products, Inc.
of California
11611 S. Alameda—Kimball 9[illegible]
Los Angeles 2, Calif.

EXCELLENT 6,500-Ft. ROTARY RIG

Complete and Ready to Drill—Attractively Priced

Practically New Drill Pipe

Wilson "Giant" drawworks No. 6464 with spinning and breakout catheads, powered by two 225 H.P. Le Roi engines—127-ft. Oil Well mast with substructure—7¼" x 14" Emsco pump—Regan block—6" Ideco swivel—27½-A Oil Well Rotary—125-ton B-J hook—water tanks—Kohler light plants—tool houses—measuring device—water pump—shale separator—pipe straightener—and late-type accessories for complete drilling rig. 4½" drill pipe with 6" O.D. tool joints has drilled three 6,000 ft. wells since new. Located at Oklahoma City.

LUCEY PRODUCTS CORPORATION
OIL WELL SUPPLIES
TULSA, OKLAHOMA

EQUIPMENT FOR SALE

FOR SALE: Wilson Mogul draw works powered by G.A.K. Waukesha engine. Good condition, priced for quick sale. Terms Melton Supply Company, Seminole, Oklahoma.

1,900' 5½" O.D. 17# Lapweld and 900' 5½" O.D. 20# Seamless all first class condition. Located McPherson, Kansas. Jay Kornfeld, 1121 Union Natl. Bank Bldg., Wichita, Kansas.

FOR SALE

12—230 H.P. Type 10 Bessemer New 17" Power Cylinders complete ready to run with 16" to 18" Compressors. 1—230 H P Clark Horizontal with Compressors. Located Salem, Illinois.

ENGLE PETROLEUM, Incorporated
Box 655, Evansville, Indiana

FOR SALE

Two Diesel Generator Rotary Drilling Rigs, one Waukesha Powered Rig. Complete inventory and prices on request.

CITIES SERVICE OIL COMPANY
Mr. Patridge, Bartlesville, Oklahoma

FOR SALE

SEAMLESS STEEL TUBING—30,000 ft.—2.027 O.D. x 1.35 I.D. 10'-12" R.L. C.D. 8615 Steel.

WALLACK BROS.
7400 So. Damen Ave., Chicago 36, Illinois

STEEL TANKS IN STOCK
2—74,000 BBL. LIKE NEW 114' X 40' TANKS ARE CLEAN—AT MORGANTOWN, W. VA.
1—5000 BBL. BOLTED AT NEW YORK
2—1000 BBL. BOLTED AT NEW ORLEANS
DAIREN CORP., 60 E. 42ND. ST., NEW YORK 17, N. Y.

EQUIPMENT WANTED

TANKS WANTED

TWO—10,000 BARREL TANKS, ONE—20,000 BARREL TANK
New or Used

Box C-620, THE OIL AND GAS JOURNAL, Tulsa, Oklahoma

EQUIPMENT FOR SALE

FOR SALE: Cardwell Drawworks, Model "L"—Air Clutches—A-1 Condition. Box 3246, Corpus Christi, Texas.

FAILING MODEL 314-C truck-mounted rig, water truck, Wheatley 6x6 pump, tool trailer, light plant, and complete tools. Most complete rig and low price warrant attention. W. D. Glenn, Box 428, Aurora, Colorado.

MURPHY DIESEL, ME-66

Brand New—Sacrifice—At OEM's Cost 1103 cu. in., 6-cylinder, 180 HP, @1200 RPM. Never been used. 20% off list. Contact: Box C-613, The Oil and Gas Journal, Tulsa, Oklahoma.

PARTS FOR ARMY TRUCKS

New and Used

Largest stock in America, 6x8, 6x4, 4x4, 4x2. All items guaranteed. Largest auto wrecking house in the west with most complete stock of new and reconditioned parts for all cars and trucks. New jeep power units complete with radiators and stub shafts. Fast service.

PIONEER AUTO WRECKING CO.
732 W. 13th Ave. Denver 17, Colo.

EQUIPMENT FOR SALE

CATERPILLAR D-13000 Diesel Power Unit, 150 HP—completely rebuilt—$3500.00. Martin Tractor Co., Chanute, Kansas.

PUMPING EQUIPMENT: Gas engine, Reid 100 HP, twin cylinder 13¼ x 16, combination compressor, complete with clutch and starting motor. Also multiple unit double eccentric power for deep wells and 22 x 70 steel building. Like new, A-1 condition. All for $4250 or sell separately. Walter E. Guebert, 4138 McKinney, Dallas, Texas.

FOR SALE: 20 KW-120—1 phase 60 cycle AC Western Electric Generating Unit LeRoi 382 Engine skid-mounted complete panel with voltage regulator, meters, circuit breaker, etc. Unused. Sacrifice. W. H. ORR, Rockdale, Texas. Phone 77.

CARDWELL M-188 Mobile Hoist with 55' Telescoping Mast and new K-428 Buda Engine—$10,500.00. C. O. Jones, P. O. Box 510, El Dorado, Kans.

FOR SALE: MC-8 Hughes-Keenan Roustabout Crane with 21' to 27' gooseneck telescoping type boom. Mounted on TD-18 International Tractractor powered by six cylinder Diesel motor with electric starter. Will handle 10 ton pipe at 9' radius. NOT War Surplus. Used very little. Priced low. Photo on request. Mackintosh Engineering Co., 2907 Library Ave., Cleveland, Ohio.

FOR SALE: Franks Model D shot hole drill. Mounted on 1942 Ford. Rig and truck in A-1 condition. Must see to appreciate. $3,500 cash. Seismograph Drilling Supply, Britton, Oklahoma.

FOR SALE: Model 76 Star Drilling Rig complete w/ 5" & 7" tools. Dietz Drilling Co., 438 N. Elm St., Henderson, Ky.

FOR SALE: Armstrong Drilling Rig, complete with 6 and 8-in. tools plus light plant. Douglas County Water Service, 1500 East 23rd, Lawrence, Kansas.

FOR SALE: Oil Field Blacksmith's Shop Equipment, 1100 pound steam hammer and 40 horse power boiler. Stock of Sealed Power Compression Piston Rings for Oil Field type engines, 9" to 17" diameter. We are discontinuing sale of these rings. Will sell all or part. Priced to sell. Inquire, Worth Machine Shop, 1200 North Lansing, Mt. Pleasant, Michigan.

PATENT ATTORNEYS

PATENT Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommell Registered Patent Attorneys, Suite 418 815-15th Street, N.W., Washington 5, D. C

ROYALTIES

DEEDED ROYALTIES
San Juan Basin & Permian Basin. Write Harry S. Wright, Wright Bldg., Farmington, New Mexico.

ROYALTIES IN HOT AREAS!
Recent strikes have focused attention on Montana's deeper oil zones and major companies are moving fast, drilling and leasing. We buy direct in the field, sell direct to our customers. Write LANDOWNERS ROYALTIES COMPANY, Box 1225, Great Falls, Montana.

WANTED: ROYALTIES AND PRODUCTION. We are buyers. Send full particulars. Immediate action. Gerber & Company, 120 Wall Street, New York.

REAL ESTATE

FOR SALE: In Latimer County, Oklahoma, 2,600 acres. Fee. $7.50 per acre, all mineral rights included. Details: E. Jester, 12744 Vanowen, North Hollywood, California.

NEW TOWERS — IMMEDIATE DELIVERY

TWO—5'6"ID X 15'—350# W. P. Accumulators. Stress Relieved. Mfg. American Locomotive Company, Port Erie, New York.

TWO—5' ID X 89'6" X 1¼" thick, 350# W. P. 34 bubble trays, Depropanizer Towers. Stress Relieved. Mfg. American Locomotive Company, Port Erie, New York.

DRAWINGS AVAILABLE

PETROLEUM EQUIPMENT, INC.

P. O. Box 887 **Trasher Bldg.**
Telephone 2-8291 **Tulsa, Oklahoma**

USED STEEL TUBING

95,000 ft.	1½" O.D.	9 gauge wall (2 lbs. per ft.)
120,000 ft.	2" O.D.	11 gauge wall (2 lbs. per ft.)
110,000 ft.	2¼" O.D.	11 gauge wall (2¼ lbs. per ft.)
30,000 ft.	3¼" O.D.	10 gauge wall (4½ lbs. per ft.)
80,000 ft.	4" O.D.	10 gauge wall (6 lbs. per ft.)
21,000 ft.	5½" O.D.	3/16" wall (11½ lbs. per ft.)

Single or Double Random Lengths—Plain Ends
Beveled for Welding

All Walls and Weights are Approximate

Write—Wire—Phone

SONKEN-GALAMBA CORPORATION
2nd and Riverview (X-338) Kansas City 18, Kansas
THatcher 9243

HELP WANTED

REFINERY EXECUTIVE NEEDED

An American oil company, affiliated with Standard Oil Co. (N.J.) and located in South America, needs a

GENERAL FOREMAN

Receiving and Shipping Department

High School or equivalent, approximate age 35. Minimum experience ten years in supervision in directing the functions of employes handling crude and refined products, schedules, operating plans, lines, operations, blending of refined products and pumping and gauging.

• • •

Liberal salary, other cash payments, retirement plan, paid vacations, excellent opportunities for career work.

• • •

Send details of experience and education to:

Box 308-G

RADIO CITY STATION

New York 19, N. Y.

Replies are held strictly confidential.

PETROLEUM or Mechanical Engineer for sales and service position in Gulf Coast Area with manufacturer of oil field equipment located in the Gulf Coast. Salary based on training and experience. Write giving training, experience and personal details. Box C-647, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

CIVIL OR MECHANICAL ENGINEER

Oil Refinery, located in Houston, needs a civil or mechanical engineer. Must have a degree and at least five years experience in refinery work. This is a permanent position with an excellent future. Salary will depend on your ability. When replying outline your past experience and salary expected. Box C-655, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL Industry Employment Service, 319 Castle Bldg., Tulsa, Okla. Tom Robinson, Mgr., phone 4-5974. No fees to pay. Needed in Persian Gulf area, Middle East. Assistant to Drilling Superintendent with mechanical engineering degree $600. Division Pipe Line Superintendent, salary open. Rotary drillers $480, age limit 55. Derrickmen $420, age limit 26 to 35. All must be experienced. Write for details.

FOR South American work Seismic interpreter with party chief experience needed. Salary Open. Address Box C-646, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES ENGINEERS—25 to 35—with refinery, chemical, or gasoline plant training; no previous selling experience required. Knowledge of instruments desirable. Permanent. Mid-Continent area. Box C-651, The Oil and Gas Journal, Tulsa, Oklahoma.

HEAT TRANSFER ENGINEER

With experience in the petroleum industry, particularly in cooling and condensing of hydrocarbon gases and vapors with air finned surface. Box C-623, The Oil and Gas Journal, Tulsa, Oklahoma.

United Geophysical Company, Inc.

595 East Colorado Street

Pasadena 1, California

offers employment to experienced Gravity and Seismic

Party Chiefs

Seismologists

Computers

Observers

in both North and South America and the Middle East

FOREIGN EMPLOYMENT in SAUDI ARABIA

ENGINEERS—MAINTENANCE ENGINEERING: ME'S, EE'S, CE'S:

Must have 4 to 5 years maintenance experience; refinery or process plant experience desirable but not required. Will staff maintenance engineering group charged with upkeep and repair of oil facilities and camps.

FEW OPENINGS FOR ASSISTANT ENGINEERS WITHOUT ABOVE EXPERIENCE.

POWER ENGINEER and ASSISTANT: EE'S:

Graduate engineers with wide experience in power generation and distribution to supervise installation and operation of 20,000 kw. power plant and power distribution system.

CHIEF INSPECTOR: ME:

Requires intimate knowledge and extensive experience with HP boilers, pressure vessels, refinery equipment.

ENGINEERS—PROCESS AND CHEMICAL: CHE'S:

Must have 5 years experience assigned to chemical engineering problems and refinery processes.

OPERATORS

Production, Gas Oil Separators, Topping Still, Natural Gasoline Plant and Auxiliary Power Plants.

Career employment opportunities for experienced Engineers, highly skilled Technicians and Craftsmen. Board and room furnished. Vacations in United States with salary end of each 24-month period. Benefit plans.

If interested, apply by letter, giving complete employment and personal history.

ARABIAN AMERICAN OIL COMPANY

200 Bush Street, Dep't. 'A' **San Francisco, California**

HELP WANTED

REFINERY EXECUTIVE NEEDED

An American oil company, affiliated with Standard Oil Co. (N.J.) and located in South America, needs a

CHIEF CHEMIST

College degree in chemistry or chemical engineering. Approximate age 35. Ten years experience in laboratory work, five years of which must have been in a refinery laboratory. Responsible for the functioning of the analytical and inspection laboratories.

• • •

Liberal salary, other cash payments, retirement plan, paid vacations, excellent opportunity for career work.

• • •

Send details of experience and education to:

Box 308-G

RADIO CITY STATION

New York 19, N. Y.

Replies are held strictly confidential.

CIVIL ENGINEER

Require graduate Civil Engineer with minimum of 5 years experience in light construction and road building. Experience should include construction of residences and small office buildings, small permanent and semi-permanent bridges, shell and gravel road building and supervision of earth moving equipment. Installation of oil field equipment such as pipe line, storage tanks, etc., should be good surveyor and outside of company contact man. Call in person or write to Atlantic Refining Co., P. O. Box 2819, Magnolia Bldg., Dallas 1, Texas.

EXPERIENCED OIL FIELD SERVICE PERSONNEL

FIELD SUPERINTENDENTS

SALES ENGINEERS

PERFORATOR OPERATORS

Outstanding opportunities to become associated with a young and progressive organization which pioneered the development of the jet process of casing perforation and other applications of the jet method. Welex Jet Services, Inc., is the owner and licensor of these processes throughout the world. We are now expanding our field service division and are opening several new stations to better serve the oil industry.

Applications for employment from qualified oil field personnel are solicited. Those accepted will enjoy the security of key positions now and rapid advancement in our expanding field service division. Write or phone Welex Jet Services Inc., 3909 Hemphill St. (phone 4-3207) Ft. Worth 9, Tex.

HELP WANTED

REFINERY EXECUTIVE NEEDED

An American oil company, affiliated with Standard Oil Co. (N.J.) and located in South America, needs an

ASSISTANT TECHNICAL SUPERINTENDENT

Degree, preferably Chemical Engineering, approximate age 35, minimum experience 10 years diversified experience in the field of Petroleum Technology for the solution of technical problems in the operation of a refinery.

• • •

Liberal salary, other cash payments, retirement plan, paid vacations, excellent opportunity for career work.

• • •

Send details of experience and education to

Box 308-G

RADIO CITY STATION

New York 19, N. Y.

Replies are held strictly confidential.

ANALYTICAL chemist, male, for development, instrumental, and some routine work in support of research program of major oil company. Degree in chemistry and strong interest in analysis required. Good working conditions and good schools in city of 20,000 population. Salary according to qualifications. Outline education, experience, and salary requirements to Drawer 1267, Ponca City, Oklahoma.

WANTED: Petroleum Engineer with 4 to 5 years' experience in field work and reservoir studies for position in Oklahoma City, Oklahoma. Please state training experience. and salary expected in first letter. Box C-639, The Oil & Gas Journal, Tulsa, Oklahoma.

CRUDE OIL BUYER

Wanted by integrated independent refiner for Oklahoma, Kansas territory. Good starting salary and excellent opportunity for capable man. Box C-644, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED

PRODUCTION EQUIPMENT SALESMAN

Salesman for Oklahoma wanted by one of the largest oil tool manufacturers. Experienced in production specialties. Exceptionally good product. State experience and salary expected.

Box C-650

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

HELP WANTED

LEADING manufacturer of oil field equipment is looking for a first-class Mechanical Engineer, if possible with a broad knowledge of field usage of drilling and servicing equipment. Primarily, want man with ability and knowledge to direct and manage engineering program. Applicants should furnish educational background, engineering experience and reference. Address Box C-635, The Oil and Gas Journal, Tulsa, Oklahoma.

JUNIOR Petroleum Engineer for extensive waterflooding operations Eastern Kansas. Excellent opportunity for advancement. Applications confidential. Give full details of education, experience, and present salary first letter. Brundred Oil Corporation, 4722 Broadway, Kansas City 2, Missouri.

DRILLERS WANTED: Here is opportunity to average better than $100 a week on a commission (footage) basis if you are competent and sober and know how to make hole with heavy modern rigs and tools: within radius of 30 miles of Milwaukee. Gray Well Drilling Co., Delafield, Wisconsin. Phone 1051.

EXPERIENCED ENGINEERS NEEDED

An American oil company, affiliated with Standard Oil Co. (N.J.) and located in South America needs experienced engineers as follows:

PRODUCING

Petroleum, Electrical, Mechanical, Civil and Construction Engineers and Geologists.

REFINING

Refinery Maintenance and Process Engineers, Designers and Equipment Inspectors.

Degree and three years minimum experience.

• • •

Liberal salaries, other cash payments, retirement plan, paid vacations, excellent opportunities for career work.

• • •

Send details of experience and education to:

Box 308-G

RADIO CITY STATION

New York 19, N. Y.

Replies are held strictly confidential.

PRODUCTION SUPERINTENDENT

Attractive position open to a first-class production man with rotary and cable tool development experience. Prefer man with engineering training but not required if applicant is 35-45 with good education and capable of exercising independent action. Location: Ill.-Ind.-Ky. area. Write giving details of experience, education, and salary expected. Box C-649, The Oil and Gas Journal, Tulsa, Oklahoma.

MECHANICAL ENGINEER

Require graduate Engineer with minimum of 5 years experience with internal combustion or compressors. Should also have some electrical experience. Headquarters, Midland, Texas. Permanent position. Company Car. Retirement, Hospitalization. Paid Vacations, Sickness Benefits, etc. Call in person or write Atlantic Refining Company, P. O. Box 2819, Magnolia Bldg., Dallas, Texas.

HELP WANTED

FOREIGN EMPLOYMENT In SAUDI ARABIA For QUALIFIED

GEOLOGISTS

Surface Mapping
Sub-Surface
Economic

SENIOR PALEONTOLOGIST

ENGINEERS

Triangulation Party Chief
Leveling Party Chief

SURVEYORS

Triangulation
Recorder-Triangulation
Precise Leveling

Career employment opportunities. Board and Room furnished. Vacation in U.S. with salary end of each 24-month period. Benefit plans.

If interested, apply by letter giving complete employment and personal history.

ARABIAN AMERICAN OIL COMPANY

200 Bush Street **Dept. 'A'**
San Francisco, California

SITUATIONS WANTED

EXPERIENCED PROCESS ENGINEER: B.S. Chemical Engineering. Eleven years complete refinery experience with major oil company including responsible supervision. Desire permanent position preferably in middle-west with progressive refining organization needing technical refining experience. Readily qualify for responsible position in process engineering or operations supervision. Age 33, married, with family. Box C-632, The Oil and Gas Journal, Tulsa, Oklahoma.

REGISTERED Petroleum Engineer, currently employed, desires position with additional activity. 11 years in Mid-Continent and Rocky Mountain Areas. Actively engaged in operational phases of drilling, development and production. Age 37, married. Box C-643, The Oil and Gas Journal, Tulsa, Oklahoma.

CONTROLLER-EXECUTIVE

Presently employed but now desires a change with a future. Graduate accountant with over twenty years' experience in all phases of oil accounting, particularly production, refining and crude purchasing. Thoroughly capable of reorganizing your accounting department or can qualify as an Executive's Assistant. Write The Oil and Gas Journay, Box C-648, Tulsa, Oklahoma.

OUTSIDE positioh contacting landowners, producers, regulatory bodies, by man with 23 years' experience, 44 years age, wide acquaintance Mid-Continent operators and fields, and with independent income. Biography upon request. Box C-653, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

PRIVATE SECRETARY, available January 1st, to gentleman desiring services of experienced business woman, capable full responsibility. Efficient, trustworthy, middle-aged, pleasing personality, refined, well-educated, good character. Diversified experience in oil industry, banking, investments, securities, commodities, cash and futures. Located Kansas City, would relocate for unusual opportunity, preferably Southwest or West. Salary commensurate. Best references. Box C-654, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE PETROLEUM ENGINEER: Fourteen years' engineering experience, major companies, desires responsible position with independent operator, consultants or consider service company. Qualified for field and office supervision of drilling, producing, engineering and geological work. Dependents. Available now. Details upon request. Box C-638, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOPHYSICIST M.S. Degree in mining, experienced gravity meter surveys, desires work leading to interpretation. Box C-642, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE PETROLEUM ENGINEER Now employed as executive assistant with large producing company. Experienced in technical administrative work. Age 33. Desires position with established oil company or equipment concern. Prefers east or mid-west. Box C-604, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMICAL ENGINEER: Available November 1, 1948. Graduate Texas A. & M. Age 32, veteran. Any permanent location considered. John W. Potts, 5316 Longview Street, Dallas, Tex.

SERVICES

EXPERIENCED Independent Geological Draftsman will make formational top tracings, etc., of your information by contract. P.O. Box 1884, Tulsa.

JUST COMPILED. List of oil companies, pipeline contractors and drilling contractors operating in South America and Middle East, showing where you can apply for jobs overseas. Price $5.00. Oil Industry Mailing List Company, Box 2603, Tulsa, Okla.

RANCHES AND FARM LANDS

25,000-ACRE Florida Ranch—Well blocked, improved pastures, river frontage. Timber estimated $1,000,000. Offered with 2,000 cattle, 2,000 hogs, ranch equipment and improvements, also all mineral rights subject existing major leases. Ideal year round climate, excellent wild turkey and deer hunting, fishing. For price, terms, address Box 3747, Orlando, Florida.

LEGAL BLANKS

BURKHART LEGAL BLANKS since 1908. Oil-Gas (all states), Business, Real Estate, Legal Forms, Leases, Revised With Government Regulations, Commercial Printing, Catalog and Samples on request. Burkhart Printing & Stationery Company, 118 South Cincinnati, Tulsa 3, Oklahoma.

LEASE AND DRILLING BLOCKS

830-ACRE block, Osage County, Oklahoma. Near production with four sands 1600 to 2050'. Will farm out block to responsible operator who is financially able to drill several wells and develop block. Box C-652, The Oil and Gas Journal, Tulsa, Oklahoma.

LEASES ROYALTIES
PRODUCING OR NONPRODUCING
Texas, New Mexico, Oklahoma, Louisiana and Illinois.
Inquiries Invited
B. D. BUCKLEY
60 Broadview Drive, Clayton (5), St. Louis, Missouri

Equipment Men

(Continued from page 156)

General Controls Opens Missouri, Okla. Branches

J. F. Ray, director of sales for General Controls, has announced the appointment of B. L. Lerch as factory

B. L. LERCH

O. D. SHADDOX

branch manager of a new St. Louis office. Lerch joined General Controls September 1, 1947, as branch manager of the Dallas office. He was formerly with Mercoid Corp. in Chicago for 10 years. O. D. Shaddox has been appointed factory branch manager of the new Oklahoma City office. Shaddox joined General Controls December 1, 1945, as sales engineer at the Kansas City factory branch. Addition of these two new offices makes a total of 17 factory branches for General Controls.

France Packing Appoints Morgan to Sales Force

Appointment of Berney L. Morgan as sales representative in the Houston territory is announced by France Packing Co., Philadelphia. Morgan, a native Texan, is returning to his home state from the East where he was associated with Ingersoll-Rand Co. for 11 years. He has spent a number of years in the erecting, servicing, and sale of engines and compressors. He will cover the Gulf Coast, Central and East Texas, Louisiana, and Southern Arkansas with headquarters in Houston.

Iverson Appoints McDonough

Ed Robertson, sales manager of Iverson Supply Co., Tulsa, announces the addition of J. B. McDonough to the sales staff. He will work out of the Houston office, located at 909 Standard Building. Prior to his connection with Iverson, McDonough was associated with United Supply Co. in the Gulf Coast area.

Christensen New Vice President for Marley

Lyle A. Christensen, general sales manager of Marley Co., Inc., manufacturers of water - cooling equipment, was recently appointed a vice president of the company. Christensen has been with Marley for 7 years. He was sales engineer in the New York office for 5 years, moved to the home office in Kansas City in 1946, and became general sales manager in 1947. Before joining Marley, Christensen worked for Ingersoll-Rand for 12 years.

Koenig and Terhune Named by Tagliabue

A. G. KOENIG

Appointment of A. C. Koenig as general sales manager, and G. A. Terhune as advertising manager of C. J. Tagliabue Corp. (N.J.), has been announced by E. R. Mellen, president of Tagliabue and its parent company, Weston Electrical Instrument Corp.

Koenig served as general sales manager of the old Tagliabue company before its purchase by Weston. Terhune, as advertising manager, continues an affiliation with Tagliabue that began in 1929.

Sales and advertising programs are conducted from Weston premises, Newark, where all Tagliabue facilities and activities are now centered.

Askania Regulator Names Tweedle Vice President

C. E. TWEEDLE

C. E. Tweedle, assistant to the president of Askania Regulator Co., was elected vice president of the company at the last meeting of the board of directors, H. J. Velten, president, announced. Tweedle first became associated with Askania in 1946. Prior to that time he served in the United States Navy as commander and was executive officer of the administration command, Great Lakes Naval Training Center. He was engaged in consulting engineering work prior to the war.

ADVERTISERS

Aluminum Co. of America 122
American District Steam Co. 146
American Hair & Felt Co. 114
American Iron & Machine Works Co. 134, 135
American Roller Bearing Co. 142
American Steel & Wire Company 12, 13
Armco Drainage & Metal Products, Inc. 68
Armstrong Machine Works 111
Baird Manufacturing Co. 148
Baker Oil Tools, Inc. 52
Bettis Corporation 94
Blaw-Knox Company 90
Bovaird Supply Co., The 15
Broderick & Bascom Rope Co. Back Cover
Brown Fintube Co., The 27
Burgess-Manning Co. 93
Bute Co., James 155
Butler Manufacturing Co. 102
Cameron Iron Works, Inc. 34
Chapman Valve Mfg. Co., The 5
Chase Brass & Copper Co. 121
Chicago Bridge & Iron Company Inside Back Cover
Christensen Diamond Products Co. 141
Chrysler Corp. (Industrial Engine Division) 39
Classified Advertising 157, 158, 159, 160, 161
Climax Engineering Co. 22
Connelly, Inc. 120
Core Laboratories, Inc. 35
Crose Mfg. Co., Inc. M. J. 124
Darling Valve & Mfg. Co. 92
Dean Brothers Pumps, Inc. 93
Diamond Chain Co., Inc. 136
Dowell Incorporated 50
Dragon Manufacturing Co. 150
Dresser Industries, Inc. 26
du Pont 38
Eagle-Picher Co., The 147
Edward Valves, Inc. 20, 21
Empire Trust Co. 93
Enardo Manufacturing Co. 133
Fairbanks, Morse & Co. 2
Fairchild Aerial Surveys, Inc. 29
Falstrom Company 154
Floridin Company 88
Ford Motor Co. 104
Foxboro Company, The 28
General American Transportation Corporation 98
General Paint Corporation 32
Geolograph Co., Inc., The 133
Gilmer Co., L. H. 47
Globe Oil Tools Co. 130
Goodrich Company, The B. F. 3
Grancell, I. H. 131
Graver Tank & Mfg. Co., Inc. 14
Griscom-Russell Co., The 17
Hill, Hubbell and Co. 32
Hobb Swetnam Co., Inc. 155
Hudson Engineering Corp. 126, 127
Hughes Tool Co. ..... Front Cover
International Harvester Co. 83
Johns-Manville Corporation 140
Johnston Oil Field Service Corp., M. O. 44
Jones & Laughlin Supply Co. 33
Kennedy Valve Mfg. Co., The 90
Lane-Wells Company 23
Lebanon Steel Foundry 112
Link-Belt Company 18
L-K Pump Valve Co. 107
Lloyd Metal Foundry Co. 125
Marman Products Co., Inc. 111
Mathey Machine Works, Inc., Frank 132
Mavor, James E. 124
Maxim Silencer Co., The 88
McCord Corporation 154
McKee & Company, Arthur G. 87
McVean & Roberts 123
Miller Sand Pump Co. 132
Millison Co., W. B. 148
Mission Manufacturing Co. 138
Mud Products, Inc. 145
Murphy Diesel Company 9
Natasco Co., The 43
National Airoil Burner Co., Inc. 120
National Tube Company 16
Nelson Electric Supply Co. 110
Nikoh Tube Co. 41, 42
Oakite Products, Inc. 110
Oil and Gas Journal, The 120, 133
Oil Well Supply Co. 36
Oklahoma Contracting Co., Inc. 124
Oliver United Filters, Inc. 129
Otis Pressure Control, Inc. 7
Owen Tool Company 132
Pacific Pumps, Inc. 26
Paddock Sales of Texas 148
Paris Distributor, Inc., Henry H. 155
Parkersburg Machine Co. 132
Parkersburg Rig & Reel Co., The 4
Parkhill Truck Co., Inc. 125
Patterson-Ballagh Division, Byron Jackson Co. 8
Penberthy Injector Co. 67, 131
Perco Division of Phillips Petroleum Co. 118
Perrault Brothers, Inc. 123
Pittsburgh Steel Co. 101
Powell Co., The Wm. 116
Reading-Pratt & Cady Division of American Chain & Cable Co., Inc. 45
Refinery Engineering Co., The 11
Riddle Oil Co. 107
Ross-Martin Co. 150
Sapulpa Tank Co. 144
Schlumberger Well Surveying Corporation 97
Schramm, Inc. 31
Shand & Jurs Co. 40
Smith Corp., A. O. 10
Squire Co., John P. 120
Standard Oil Co. of California 46
Standard Oil Sales Co. 149
Standco Brake Lining Co. 132
Strom Steel Ball Co. 150
Taylor Forge & Pipe Works 6
Texas Co., The 30
Thornhill-Craver Co. 80
U. S. Steel Corp. Subsidiaries 12, 13, 16, 36
Universal Oil Products Co. 70, 71
Vapor Recovery Systems Co., The 37
Walworth Co. 1
Warner Lewis Co. 119
Welex Jet Services, Inc. 111
Well Equipment Mfg. Corp. 143
Western Supply Co. 19
Westinghouse Electric Corporation 24, 25
Williamson, Inc., T. D. 125
Worthington Pump and Machinery Corp. 48, 84, 85
Wyatt Metal & Boiler Works Inside Front Cover

Indiana Fields

(Continued from page 150)

now flowing 35 bbl. of oil per hour through casing from perforations opposite the Devonian at 1,672-1,702 ft. Oil is 43° gravity. The pay was treated with 1,000 gal. of acid.

INDIANA SUCCESSFUL WILDCAT

Posey County: A. J. Slagter, Jr., 1 C. Herrenbuck, SW NE SW 2-6s-12w, IP 45 bbl., McClosky 2,632-40 ft., TD 2,671 ft.

INDIANA WILDCAT FAILURES

Posey County: J. S. Young, Jr., 1 Kaufman, NW NW SE 4-6s-1w, dry, TD 2,902 ft.

Spencer County: Gale & Walters 1 Neumier, SW SE SE 36-5s-4w, dry, TD 893 ft.

Vanderburgh County: Calvert & Willis 1 Tweedall, SW SW SE 30-5s-10w, dry, TD 2,530 ft.

Vigo County: G. F. Johnson et al 1 H. Kerns, SW SW NW 11-11n-9w, dry, TD 1,864 ft.

Southeast New Mexico

(Continued from page 149)

tops have been released. Humble Oil & Refining Co. 1 Gorman-Federal, 30-15s-22e, was drilling below 2,875 ft.

Eddy County.—Magnolia 1 Foster Unit, 26-20s-23e, drilled limestone at 2,900 ft. Magnolia 1 Golden, 29-21s-22e, is a new 3,500-ft. test 29 miles northwest of Carlsbad. It was drilling below 760 ft.

Lea County.—Magnolia had drilling under way at its new 12,000-ft. wildcat, the 1 Cox-Federal in 1-9s-36e, 4½ miles northeast of the one-well Crossroads field. In the Crossroads area, Mid-Continent Petroleum Corp. 1-B U. D. Sawyer, 34-9s-36e, was drilling below 10,904 ft. after recovering some oil on a drill-stem test from 10,667-10,767 ft., apparently in the Strawn of the Pennsylvanian. With the tool open 1 hour, the recovery was 2,000 ft. of water blanket, having about 2 gal. of free oil on top and 200 ft. of drilling mud.

Other wells drilling in the area were: Magnolia 1-C Santa Fe-Pacific, 26-9s-36e, drilling below 9,995 ft. Mid-Continent 1 Dessie Sawyer, 27-9s-36e, drilling below 10,375 ft. Skelly Oil Co. 1 U. D. Sawyer, 33-9s-36e, was below 10,618 ft.

Stanolind 1-U State, 2-20s-38e, prepared to drill-stem test to total depth at 7,980 ft., in dolomite. It had base of the Permian at 7,940 ft. and top of the Devonian at 7,970 ft. Elevation is 3,580 ft.

Continental Oil Co. 1-B-29 Warren Unit, 29-20s-38e, was drilling below 5,297 ft., with no details reported on formations.

Texas Pacific Coal & Oil Co. 39-A State Account 2, 9-22s-36e, gaged 8½ bbl. of oil in 2 hours, on gas lift, from perforations at 10,880-10,950 ft.

SOUTHEAST NEW MEXICO WILDCAT FAILURE

Lea County: Emperor Oil Co. 1 State, SW SE 23-21s-33e, 3 mi. S Lynch field, dry, TD 4,125 ft., had hole full of salt water.

CALENDAR

November

American Society of Mechanical Engineers, fuels division, Greenbrier Hotel, White Sulphur Springs, W. Va., November 3-4.

Society of Automotive Engineers, fuels and lubricants division, Mayo Hotel, Tulsa, November 4-5.

American Petroleum Institute, annual meeting, Stevens Hotel, Chicago, November 8-11.

Dallas Geological Society and Dallas Geophysical Society, joint regional exploration meeting, Adolphus Hotel, Dallas, November 18-19.

Rocky Mountain Oil and Gas Association, annual meeting, Cosmopolitan Hotel, Denver, Colo., November 18-20.

American Society of Mechanical Engineers, annual meeting, Hotels Pennsylvania and New Yorker, New York, November 28-December 3.

December

Petroleum Electric Power Association, twentieth annual meeting, Biltmore Hotel, Oklahoma City, December 2-3.

National Gasoline Association of America, regional meeting, Amarillo, Tex., December 3.

Interstate Oil Compact Commission, quarterly meeting, Allis Hotel, Wichita, Kans., December 9-11.

1949

January

Society of Automotive Engineers, annual meeting, Book-Cadillac Hotel, Detroit, Mich., January 10-14.

February

American Society for Testing Materials, spring meeting and A.S.T.M. committee week, Hotel Edgewater Beach, Chicago, Ill., February 28-March 4.

March

National Association of Corrosion Engineers, annual convention, Cincinnati, Ohio, March 7-10.

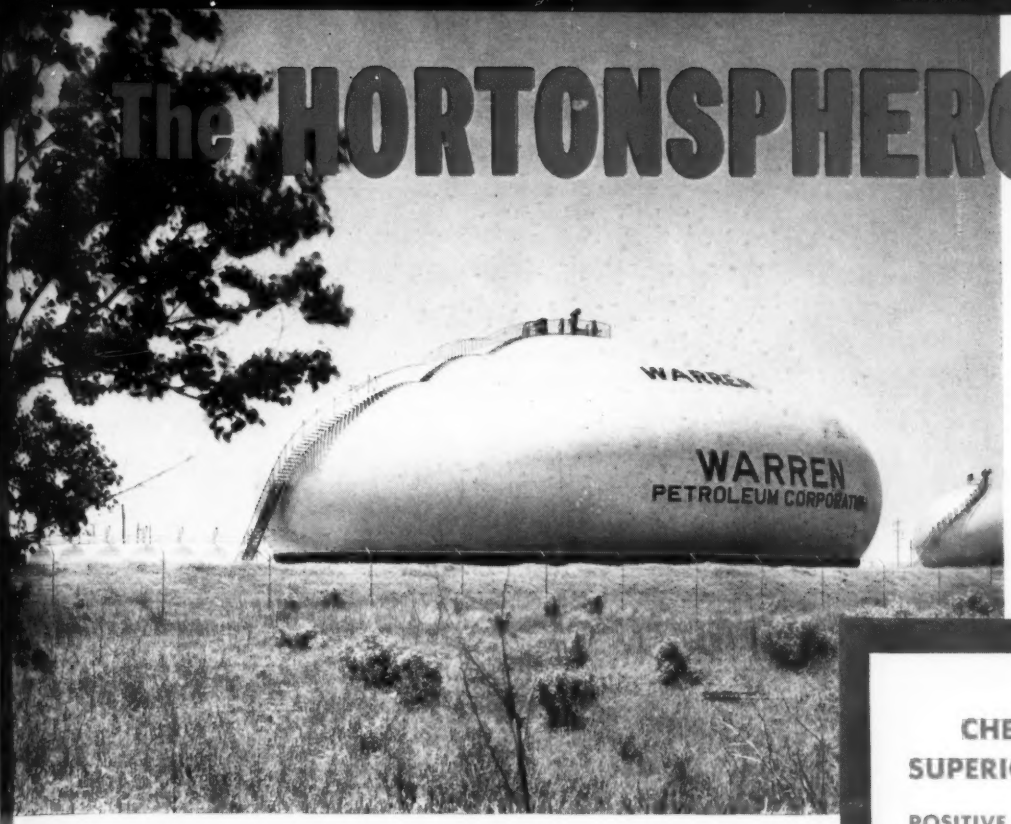
NOMADS

Houston Nomads, second Monday of each month, The Houston Club, Houston.

Los Angeles Nomads, second Wednesday each month, Jonathan Club.

TABLE OF CONTENTS ON PAGE 51

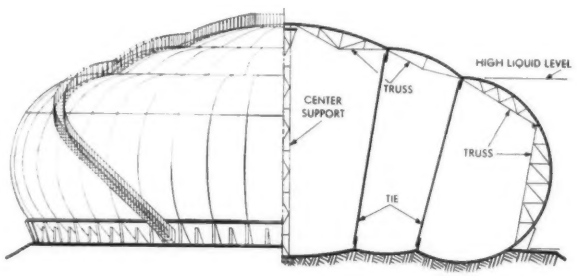
The HORTONSPHEROID



Protection for Volatile Liquids

The Hortonspheroid is the pressure container designed to provide the greatest possible economy in the storage of moderately volatile liquids ranging from motor gasolines to natural gasolines. You can count on the Hortonspheroid for dependable low cost-per-barrel storage year after year without operating expense or costly maintenance.

Our Bulletin E contains complete information. Write our nearest office for your copy.



The above drawing is an elevation and section of a 100,000-bbl. noded Hortonspheroid having 2 nodes, similar to the one shown at the top of the page at the Warren Petroleum Corporation's Houston, Texas, terminal. Noded Hortonspheroids are made in capacities from 40,000 to 120,000 bbls. for pressures from 2½ to 20 lbs. per sq. in. The smooth Hortonspheroid design is used for capacities from 2,000 to 40,000 bbls. for pressures from 2½ to 100 lbs. per sq. in. (higher pressures available only in the smaller sizes).

CHECK THESE SUPERIOR FEATURES

POSITIVE PROTECTION
No evaporation loss occurs as long as the pressure in the tank is below the relief valve setting.

DEPENDABLE OPERATION
Normal maintenance assures dependable operation in all climatic conditions. No moving parts.

FLEXIBILITY
Efficiency in preventing standing storage losses is independent of liquid level in tank.

LOW OPERATING COST
No operator, no machinery required.

DURABILITY
Oxygen is rarely present inside tank to cause interior corrosion.

FIRE SAFETY
Air-vapor mixture in tank is too rich to ignite. Fire hazard reduced to minimum.

CHICAGO BRIDGE & IRON COMPANY

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PENNSYLVANIA

Atlanta, 3.....2154 Healey Bldg.
Birmingham, 1.....1536 North 50th St.
Boston, 10.....1025-201 Devonshire St.
Chicago, 4.....2128 McCormick Bldg.
Cleveland, 15.....2204 Guildhall Bldg.
Detroit, 26.....1514 Lafayette Bldg.
Havana.....402 Abreu Bldg.
Houston, 2.....2119 National Standard Bldg.
Los Angeles, 14.....1423 Wm. Fox Bldg.
New York, 6.....3347-165 Broadway Bldg.
Philadelphia, 3.....1615-1700 Walnut Street Bldg.
Salt Lake City, 1..1525 First Security Bank Bldg.
San Francisco, 11..1254-22 Battery Street Bldg.
Seattle, 1.....1325 Stuart Bldg.
Tulsa, 3.....1606 Hunt Bldg.

REPRESENTATIVES AND LICENSEES

Horton Steel Works, Limited, Fort Erie, Ontario, Canada
Ateliers et Chantiers de la Seine Maritime, Paris, France
Constructions Metalliques de Provence, Arles-sur-Rhone, France
Compania Tecnica Industrie Petroli, S.A.I., Rome, Italy
Leopoldo Sol & Cia., Reconquista 558, Buenos Aires, Argentina
Whessoe, Limited, Darlington, England
Motherwell Bridge & Engineering Company, Limited, Motherwell, Scotland
Chicago Bridge & Iron Company, Limited, Apartado 1348, Caracas, Venezuela

ALL FOR ONE!
There's no letup for oil field equipment. It looms large in the building of an even more productive America—all industry's goal. As much as ever, therefore, you need the firm grip on wire line operations that *Preformed* Yellow Strand provides. Let its stout steel wires handle your heavy drill strings securely. Use its limberness to speed pipe-laying . . . to fight fatigue on winches . . . to simplify erection jobs. The long-lasting wire line is the *economical* line. Specify *Preformed* Yellow Strand by name.
Broderick & Bascom Rope Co.
St. Louis
Houston Branch: 1311 Palmer St.
THE CONTINENTAL SUPPLY CO.
Mid-Continent Distributors
Stores Located in All Active Fields
THE REPUBLIC SUPPLY CO.
of California
Oil Field Distributors for Calif.
THE McJUNKIN SUPPLY CO.
Charleston
West Virginia
BRODERICK & BASCOM
Yellow Strand
PREFORMED ROTARY LINE

!

It
re
As
ip
w
le
r-
n
g-
fy

.

.